THE ATHENÆUM

Journal of English and Foreign Literature, Science, and the Fine Arts.

No. 619. LONDON, SATURDAY, SEPTEMBER 7, 1839. PRICE FOURPENCE. (Stamped Edition, 5d.)

For the convenience of Subscribers in remote places, the weekly numbers are reissued in Monthly Parts, stitched in a wrapper, and forwarded with the Magazines.—Subscriptions for the Stamped Edition for the Continent, for not less than 3 Months, and in advance, are received by M. BAUDRY, 9, Rue du Coq-St.-Honoré, Paris, or at the Athenæum Office, London. For France, and other Countries not requiring postage to be paid in London, 28 fr. or 11. 2s. the year. To other countries, the postage in addition. [JAMES HOLMES, TOOK'S COURT.]

KING'S COLLEGE, LONDON.—MEDICAL SCHOOL, 1839-40.—The WINTER SESSION will commence on TUESDAY, the 1st of October, 1839, with an INTRODUCTORY LECTURE, by Professor ARNOTT, at Two o'clock.
DESCRIPTIVE and SURGICAL ANATOMY..Richard Partridge, F.R.S.
PHYSIOLOGY, GENERAL and MORBID ANATOMY..R. B. Todd, M.D. F.R.S.
CHEMISTRY..J. F. Daniell, F.R.S.
MATERIA MEDICA and THERAPEUTICS..J. F. Royle, M.D. V.P.R.S.
MEDICINE..Thomas Watson, M.D.
SURGERY..J. M. Arnott.
MIDWIFERY and DISEASES of WOMEN and CHILDREN.. Robert Ferguson, M.D.
COMPARATIVE ANATOMY..T. Rymer Jones.
The KING'S COLLEGE HOSPITAL will be opened early in the ensuing Session, so that the Medical Students can now complete their education at King's College.
August 27, 1839. J. LONSDALE, B.D. Principal.

UNIVERSITY COLLEGE, LONDON.—FACULTY OF ARTS AND LAWS.—Session 1839-40.
The Session will commence on Tuesday, the 15th October.
Classes.
LATIN..Professor Key, A.M.
GREEK..Professor Malden, A.M.
HEBREW..Professor Hurwitz.
ARABIC, PERSIAN, and HINDUSTANI..Prof. Falconer, A.M.
CHINESE LANGUAGE and LITERATURE..Professor Rev. Samuel Kidd.
ENGLISH LANGUAGE and LITERATURE..Prof. Latham, A.M.
FRENCH LANGUAGE and LITERATURE..Prof. Merlet.
ITALIAN LANGUAGE and LITERATURE..Prof. Pepoli.
GERMAN LANGUAGE..Teacher, Mr. Wittich.
MATHEMATICS..Professor De Morgan.
NATURAL PHILOSOPHY and ASTRONOMY.. Professor Sylvester, F.R.S.
CHEMISTRY (Practical Course, commencing in January).. Professor Graham, F.R.S.
CHEMISTRY (Course for the Matriculation Examination in Arts at the University of London)..Professor Graham.
BOTANY, Junior Class do. (commencing in April)..Professor Lindley, Ph. D.
ZOOLOGY..Professor Grant, M.D.
PHILOSOPHY OF MIND and LOGIC..Professor the Rev. J. Hoppus, Ph. D.
ENGLISH LAW (commencing 5th Nov.)..Prof. Carey, A.M.
JURISPRUDENCE (commencing 4th Nov.)..Prof. Graves, A.M.
CIVIL ENGINEERING..Professors De Morgan, Graham, and Sylvester.
SCHOOLMASTERS' COURSES..Professor Key, De Morgan, Sylvester, and Malden.
FLAHERTY SCHOLARSHIPS.
A Flaherty Scholarship of 50*l.* per annum, tenable for four years, will be awarded in 1840 to the best proficient in Mathematics and Natural Philosophy among the Students of the College under the age of twenty years. The Examination will take place in the second week in October. A similar Scholarship for proficiency in Classics will be awarded in 1841, and in subsequent years, alternately, for proficiency in Classics, and in Mathematics and Natural Philosophy. Printed copies of the Regulations concerning these Scholarships may be had on application at the Office.
The Session of the Faculty of Medicine commences on 1st October. The Junior School re-opens 24th September.
3rd September, 1839.
HENRY MALDEN, Dean of the Faculty.
CHAS. C. ATKINSON, Secretary to the Council.

SCHOOL of DESIGN for the EDUCATION of ARTISTS and INSTRUCTION of AMATEURS in the THEORY and PRACTICE of DRAWING and PAINTING, possessing every requisite for the study of the Human Figure, anatomically, as well as in its full developement of perfect beauty and expression, combined with the principles of Geometry, Optics, Perspective, and other branches of the Fine Arts, forming also a Probationary School for the Royal Academy.—A Vacancy for a Pupil in the House.—Terms may be had at 6, Charlotte-street, Bloomsbury, corner of Streatham-street.

THE NEW ASSIZE COURTS, LIVERPOOL. —TO ARCHITECTS.—The Council of the Borough of Liverpool, having determined on the Erection of new Assize Courts for the Southern Division of the County of Lancaster, are ready to receive DESIGNS for that BUILDING, for the erection and completion of which it is proposed to appropriate a sum not exceeding 50,000*l.* A Premium of 300 guineas will be paid for the Design which the Council shall consider best adapted for the purpose, and 200 guineas for the second best. Printed particulars, containing a general statement of the accommodation required, with a plan of the land and its approaches, may be had on application at the Surveyor's Office, Town-hall. The Designs must be sent in on or before the 1st of January next, addressed to the Mayor of Liverpool, and marked "Designs for the Assize Courts."

METROPOLITAN LIFE ASSURANCE SOCIETY, FOR MUTUAL ASSURANCE.
Directors.

John Allcard, Esq.	Thomas H. Hall, Esq.
Richard Low Beck, Esq.	Charles Hensley, Esq.
Edmund C. Buxton, Esq.	Joseph Hoare, Esq.
John Burgess, Esq.	J. Francis Maubert, Esq.
William Clay, Esq. M.P.	Joseph Pease, Esq. M.P.
James Dawson, Esq.	John Taylor, Esq.
Thomas Fowler, Esq.	J. Scholefield, Esq. M.P.
Francis Fox, Esq.	John Travers, Esq.
W. Storrs Fry, Esq.	George Vaughan, Esq.

The Directors hereby give Notice to Members whose Premiums fall due on the 5th of October next, that the same must be paid within Thirty days from that date.
The leading principle of the Society is the APPROPRIATION of the WHOLE of the PROFITS (UNDIMINISHED by AGENCY or COMMISSION), by way of reduction in the premiums of Members of five years' standing.
The Premiums of Members (who are the only Proprietary) are payable yearly, half-yearly, or quarterly, on the 5th of January, 5th of April, 5th of July, and 5th of October; either of which several days constitutes the commencement of the Year to Members. Persons, therefore, desirous of entering the Society as Members on the 5th of October next, should appear at the Office on or before that day.
RICHD. HEATHFIELD, Superintendent.
Princes-street, Bank, Sept. 2, 1839.

FREEMASONS' and GENERAL LIFE ASSURANCE, LOAN, ANNUITY, and REVERSIONARY INTEREST COMPANY.
Among the many advantages to the assured in this company are, the option of taking the profits in cash; adding to the policy, reducing the premium or receiving an annuity; of effecting assurances upon increasing or decreasing premiums; and without participation of profits at reduced premiums; and of credit for half of the first five years' premiums: policies not forfeited if premium remain unpaid at the time of becoming due. No error, but only fraud, to vitiate a policy. Lives below the ordinary standard of health insured at a moderate, yet proportionate, increase of rate—Facilities for effecting loans—The business of the Company not confined to the Masonic body. Commission allowed to Solicitors and Agents.
A Director in attendance daily.
JOSEPH BERRIDGE, Sec.
11, Waterloo-place, Pall Mall, June 28, 1839.

THE ALFRED HOME and FOREIGN LIFE ASSURANCE and MUTUAL ANNUITY ASSOCIATION, 51, Old Broad-street.
Directors.

Duncan Davidson Alves, Esq.	Sir Woodbine Parish, K.C.H.
G. Ives Raymond Barker, Esq.	Sir David Scott, Bart.
Samuel Bosanquet, Esq.	Robert Scott, Esq.
Geo. Frederick Dickson, Esq.	Ernest A. Stephenson, Esq.
Hon. E. H. Grimston, M.P.	Major Tulloch.
Joseph Jellicoe, Esq.	Arthur Willis, Esq.
Wm. James Maxwell, Esq.	The Hon. Eliot T. Yorke, M.P.

Trustees.

Duncan Davidson Alves, Esq.	J. Pemberton Heywood, Esq.
Granville Sharp, Esq.	Arthur Willis, Esq.

Auditors.

Edgar Corrie, Esq.	David Powell, Esq.	J. D. Walford, Esq.

Secretary—Anthony Highmore, Esq.
Solicitors—Messrs. Maltby & Otter, 34, Old Broad-street.
Advantages of this Association.
An ample subscribed capital for the security of the assured, with the eventual advantages of a mutual life association.
Assurers admitted to the same rights as the Shareholders, and eligible to become Directors and Auditors.
Four-fifths of the profits divided every five years, by addition to policies or reduction of premiums.
Advances made to the assured, on giving security for future premiums and interest.
An important and peculiar feature in this Association is, that the assurers may reside in any part of the globe, either by paying an extra premium, or, at their option, by an arrangement for a stipulated deduction from the sum assured in case of death abroad, but for Europe, Australia, the Cape of Good Hope, or the British possessions in North America, no extra premium or deduction is incurred. Premiums may be paid quarterly, half-yearly, or annually.
ANNUITY BRANCH.
THE PURCHASERS OF ANNUITIES are treated as a separate body, their funds are kept distinct from those of the Life Association, and in addition to the following advantageous scale of rates, four-fifths of the profits are divided among the annuitants every three years by way of bonus.
Table exhibiting the Rates of Annuities payable Half-yearly.

Age	Annuity.	Age	Annuity.	Age	Annuity.	Age	Annuity.	Age	Annuity.
	£ s. d.		£ s. d.		£ s. d.		£ s. d.		£ s. d.
21	5 0 9	35	5 16 1	50	7 7 10	65	10 17 4		
25	5 4 6	40	6 3 9	55	8 4 8	70	13 1 10		
30	5 9 11	45	6 14 1	60	9 6 4	80	22 9 0		

GREAT ADVANTAGES OFFERED BY THE UNITED KINGDOM LIFE ASSURANCE COMPANY, 8, Waterloo-place, Pall Mall, and 2, Charlotte-row, Mansion House, London.
This Company, established by act of parliament, affords the most perfect security from an ample capital, and only requires, when an Insurance is for the whole period of life, one half of the very moderate premiums to be paid, for the first five years after the date of the policy, the other half may remain, subject to the payment of interest at 5 per cent. annually, to be deducted at death, or may previously be paid off at convenience.
It obviously becomes easy for a person of very moderate income to secure, by this arraugement, a provision for his family; and should he at any time after effecting the insurance succeed to, or acquire, a fortune, he may relinquish his policy, having only paid one half the premium for the first five years, instead of the whole, as in all other Companies.
Thus a man of twenty-five years old may, by an annual payment of 28*l.* 16*s.* 3*d.* for the first five years, afterwards the full premium of 57*l.* 12*s.* 6*d.* yearly, secure to his widow and children at his death payment of no less than 3000*l.*, subject only to the deduction of 144*l.* 1*s.* 3*d.*, being the amount of premium unpaid.
This Company holds out, in various other respects, great inducements to the public. When such facilities are afforded, it is clearly a moral duty in every parent who is not possessed of a fortune, but of an income, however moderate, to insure his life for a sum which may yield a comfortable provision for his family.
Rates of Premium.

Age.	Without profits.	With profits.
25	£1 18 5	£2 2 11 per cent.
30	2 3 10	2 8 2 —
40	2 19 1	3 3 4 —
50	4 9 8	4 14 5 —
60	6 15 3	6 17 9 —

Annuities are granted on very liberal terms.
Honorary Presidents.

Earl of Errol.	Lord Viscount Eastnor, M.P.
Earl of Courtown.	Lord Elphinstone.
Earl Leven and Melville.	Lord Belhaven and Stenton.
Earl of Norbury.	Sir J. H. Dalrymple, Bart.
Lord Viscount Falkland.	

Directors.
James Stuart, Esq. *Chairman.*
William Plasket, Esq. *Deputy Chairman.*

Charles Downes, Esq.	George Huntly Gordon, Esq.
Morton Balmanno, Esq.	Frederick Chas. Maitland, Esq.
Alexander Balmanno, Esq.	Hamilton Blair Avarne, Esq.
Samuel Anderson, Esq.	N. P. Levi, Esq.
Charles Graham, Esq.	John Ritchie, Esq.

Frederick H. Thomson, Esq. *Surgeon*, 48, Berners-street.
EDWARD BOYD, Esq. Resident.
Every information will be afforded by application to the Resident Director, Edward Boyd, Esq. 8, Waterloo-place, London.

ROYAL NAVAL, MILITARY, and EAST INDIA COMPANY LIFE ASSURANCE SOCIETY.
Under the gracious Patronage of the Queen.
Directors.

Lieut.-Col. Sir Frederic Smith, K.H.	Royal Engineers, *Chairman.*
Col. Sir W. Gosset, C.B. K.C.H.	Roy. Engineers, *Deputy Chairman.*
Capt. the Hon. Lord Adolphus Fitzclarence, R.N. G.C.H.	Major-General Sir J. F. Burgoyne, K.C.B.
Admiral the Right Hon. Sir George Cockburn, G.C.B.	Major-Gen. Sir John Gardiner, K.C.B. Dep.-Adjutant-Gen.
Major-General of Marines.	Col. Edward Wynyard, C.B.,
Major-General Sir James Cockburn, Bart. G.C.H.	A.D.C. to the Queen.
Captain Sir Thos. Troubridge, Bart, R.N. M.P. Lord of the Admiralty.	Col. Sir Jeremiah Bryant, C.B., E. India Company's Service.
Vice-Admiral Sir Chas. Rowley, Bart. K.C.B. G.C.H.	Col. Powell, M.P. Commanding Cardiganshire Militia, and Lord-Lieut. of the County.
Major-Gen. Sir Alexander Dickson, G.C.B. K.C.H. Direct.-Gen. Field Train Dep. and Dep.-Adj.-Gen. Royal Art.	Lieut.-Colonel Henry Hanmer, late R.H.G. K.H.
Major-Gen. Sir Patrick Ross, G.C.M.G. K.C.H.	Lieut.-Colonel Purchas, East India Company's Service.
Lieut.-Gen. Sir Frederick Wm. Mulcaster, K.C.H. Inspector-General of Fortifications.	Major Shadwell Clerke, K.H. F.R.S.
	A. Hair, Esq. M.D. R.H.G.
	Captain Melville Grindlay, East India Army Agent.
	Wm. Chard, Esq. Navy Agent.

Prospectuses and every information to be obtained at the Office, 13, Waterloo-place.
WILLIAM DANIEL WATSON, Secretary.

SCOTTISH UNION FIRE and LIFE INSURANCE COMPANY, No. 449, West Strand, and No. 78, King William-street, Mansion House, London; George-street, Edinburgh; and Dame-street, Dublin.
Instituted 1824, and Incorporated by Royal Charter.
Directors.

Charles Balfour, Esq.	Walter Learmonth, Esq.
John Deans Campbell, Esq.	Richard Oliverson, Esq.
William Fane De Salis, Esq.	Divie Robertson, Esq.
J. Gordon Duff, Esq.	Hugh F. Sandeman, Esq.
James Gooden, Esq.	John Small, Esq.
John Kingston, Esq.	Daniel Stoddart, Esq.

S. Mackenzie, Esq. Manager.
The distinguishing features of this Corporation are, UNQUESTIONABLE SECURITY, LOW RATES of PREMIUM, and a combination of all the important advantages hitherto offered to the Public both in the Fire and Life Department.
Every Policy issued by this Company renders it imperative on the Directors, in the event of dispute or difficulty arising, to refer the question to arbitration.
Claims for losses in London are settled at the Office, 449, West Strand.
FIRE DEPARTMENT.
Fire Insurances effected at the usual reduced rates; and Policies may be transferred to this Office without extra charge, and on terms very favourable to the Assured.
LIFE DEPARTMENT.
This Incorporation effects Life Insurances either at Reduced Rates without Profits, or with Participation in Profits, of which two-thirds are returned at regular periods, without being subject to any deduction for charges of management.
Tables of Rates and every information may be had at the Company's Offices; or of the Agents throughout the Kingdom.
No. 449, West Strand, F. G. SMITH, Secretary.
And No. 78, King William-street, City.

ARGUS LIFE ASSURANCE COMPANY, 39, THROGMORTON STREET, BANK, LONDON.
Empowered by Act of Parliament.
The following are among the Advantages of this Company:—
1. A large subscribed Capital, with a rapidly accumulating Premium Fund invested in Government and other available Securities.
2. Charging the lowest rate of premium for the sum assured, thereby in effect giving to every policy holder a fixed and certain Bonus without any risk.
3. Assurances effected upon lives up to the age of 80.
4. Premiums payable Half-yearly or Quarterly.
5. Advances made on Policies when their value exceeds 50*l.*
6. The Policies of this Office are purchased by the Company.
7. Tables upon an increasing and decreasing scale of payment.
In Assurances for advances of money as security for debts, or when the least present outlay is desirable, the tables and rates of the Argus Office are peculiarly calculated to meet the interests of all classes of assurers.
ANNUAL PREMIUM TO ASSURE 100*l.*

Age.	For 5 Years.	For 7 Years.	Term of Life.
	£. s. d.	£. s. d.	£. s. d.
25	1 0 3	1 0 7	1 15 1
30	1 1 10	1 2 1	1 19 10
35	1 3 4	1 3 8	2 5 10
40	1 5 7	1 6 2	2 13 9

A Board of Directors, with the Medical Officers, attend daily. Commission to Solicitors and Agents.
EDWARD BATES, Resident Director.

WORKS ON NATURAL HISTORY.
I.
LYELL'S ELEMENTS of GEOLOGY, for the Use of Beginners, with 300 Woodcuts, 1 vol. 12mo. 10*s.* 6*d.*
II.
JESSE'S GLEANINGS in NATURAL HISTORY. Fourth Edition of the Three Series, in Two Pocket Volumes, with Woodcuts. fcap. 8vo. 12*s.*
III.
THE JOURNAL OF A NATURALIST. A New and cheaper Edition, with Plates, post 8vo. 9*s.* 6*d.*
IV.
SIR HUMPHRY DAVY'S SALMONIA. Third Edition, with Illustrations, fcap. 8vo. 12*s.*
V.
SIR HUMPHRY DAVY'S CONSOLATIONS IN TRAVEL. Fourth Edition, fcap. 6*s.*
VI.
LYELL'S PRINCIPLES OF GEOLOGY. Fifth Edition, with 227 Illustrations, 4 vols. 12mo. 28*s.*
John Murray, Albemarle-street.

This day is published, price 2s. 6d.

ON the THEORY of EQUATIONS.
By W. HOYLE.
London: Sherwood, Gilbert, & Piper, Paternoster-row.

Just published,

THE BRITISH AND FOREIGN REVIEW, No. XVII. *Contents.*
1. Waagen on Art in England.—Pictures and Picture-cleaners.
2. A Rural Police.—Thieves and Thief-takers.
3. The Corn Laws.—Hungary and the Baltic.
4. Wheaton on the Law of Nations.
5. Lamartine's Poems.—La Chute d'un Ange.
6. England, Austria, and Turkey.
7. The State of the Nation.—The Chartists.
8. Church and State.—The Russo-Greek Church.
London: R. & J. E. Taylor, Red Lion-court, Fleet-street.
Edinburgh: A. & C. Black. Dublin: J. Cumming.

THE MONTHLY CHRONICLE for SEPTEMBER, among many other interesting Articles by Eminent Authors, contains an elaborate Paper on Colonies and Emigration; a Philosophical Estimate of the Genius of Byron and Göthe; a *Catalogue Raisonnee* of all the German Composers; L*** F*** H*****; the Spanish Theatre; the Last Books of Summer; and Proposals for a New Act of Parliament to prevent the Use of Horses.
London: Longman, Orme, & Co.

FRASER'S MAGAZINE for SEPTEMBER.
Dr. Farmer's Essay on Shakspeare. By William Maginn, Esq. L.L.D.—The Nelson Monument—The Devil's Diary, Part II.—Lucian: No. VI. Menippus, or the Necyomantia—New Educational Genus—Basche's Wedding—The Worship of Animals—The Pythagorean and Platonic Speculations—Blue Friar Pleasantries: Selections from the Orchestra; Plymouth Hoe and Breakwater; Eddystone Lighthouse; A School Meeting—Babylon, from Petrarch—The Fêtes of July—What is our real Position?—Canova—A Quatrain on the Queen. By Sir M. O'Doherty, with a dozen of Octaves of Translation.
James Fraser, 215, Regent-street, London.

BLACKWOOD'S EDINBURGH MAGAZINE, No. CCLXXVII., for SEPTEMBER.
Contents: I. The Chartists and Universal Suffrage.—II. Royal Academy—and its Exhibitions—III. Kouli Khan—IV. Death Chant for the Sultan. By B. Simmons—V. Inscription in the New Edition of Mrs. Hemans's Works By B. Simmons—VI. French Literature of the Eighteenth Century. Part II.—VII. The Cossacks—VIII. Song-writing. Moore—IX. The Bellmanship. A True Story—X. Henry Grattan—XI. "Rot your Italianos!" By a Man Behind his Age—XII. The Court—the Cabinet—and the Country.
William Blackwood & Sons, Edinburgh; and T. Cadell, Strand, London.

THE NEW NUMBER OF
THE METROPOLITAN
for SEPTEMBER, contains:
1. Sketches of Jerusalem. By C. G. Addison, Esq. of the Inner Temple.
2. The Blind Reefer Adrift. By E. Howard, Esq. Author of 'Rattlin the Reefer,' &c.
3. The Banquet's Mirth is o'er. By Mrs. C. Baron Wilson.
4. A Pilgrimage from Fontainbleau to Scotland. By Miss Harriett Pigott.
5. The Warrior Betrothed.
6. Shakspeare Fancies. No. 7. Cleopatra and Mad. de Staël.
7. Curiosities of Legal Experience. No. 4. By a Solicitor.
8. Melodies for Music. By J. Ouseley.
9. Lord Killekelle. By Abbot Lee.
10. Secret Treasures. By Mrs. Abdy.
11. The Mask and the Face.
12. My Day-Book.
Reviews, Notices of New Books, &c. &c.
Saunders & Otley, Conduit-street.
Agents: for Ireland, J. Cumming, Dublin. For Scotland, Bell & Bradfute, Edinburgh; and Smith & Son, Glasgow.

ILLUSTRATED WITH TWO ETCHINGS BY BUSS.
The SEPTEMBER NUMBER of
COLBURN'S NEW MONTHLY MAGAZINE and HUMORIST,
Edited by THEODORE HOOK, Esq. contains:
The Planter's Birthday. By the Editor.
The Widow Married. By Mrs. Trollope. With two Illustrations by R. W. Buss.
Isaac Moss. By Douglas Jerrold, Esq.
A Stir among the Letterwriters.
The Clause in the Will. By the Author of 'Rattlin the Reefer.'
Snuff and Snuff-takers.
The Man-eater. By the Old Forest Ranger.
The Fuegians.
A Morning Conversation in Berkley-square.
Sketches of Illyria, Italy, and the Tyrol. By the Rev. G. R. Gleig.
The Life and Times of Peter Priggins.
Close of the Monsoon. By Major C. Campbell.
Tristram Dumps.
A Fair Shot. By Miss Sheridan; &c. &c.
Henry Colburn, Publisher, 13, Great Marlborough-street.

ARMY AND NAVY.
The SEPTEMBER NUMBER of the
UNITED SERVICE JOURNAL
AND NAVAL AND MILITARY MAGAZINE,
Contains, among other interesting Papers:
The Naval Gunnery Establishment on board H.M.S. *Excellent*, at Spithead.
On the Constitution and Education of the Prussian Army. By Lieut. Nelson.
Notices of the Cape and Southern Africa since the Appointment as Governor, of Major-Gen. Sir G. Napier. By Major Charters.
Working of the Coast Blockade Service, with Anecdotes of Smuggling.
Memoirs of E. Costello.
Records of an Expedition up the Quorra with Lander. By Capt. Allen, R.N.
St. Helena in 1838. By Lieut. Stuart.
Passages in the Life of a Sailor.
Island of Owhyisitso.
Major Tulloch's Report on the Health of the Troops in the United Kingdom, Mediterranean, and America.
Memoir of the late Gen. Lord Howden, G.C.B. &c.
A Voice from the Ranks.
Letters from Gibraltar, the Levant, South America, &c.
The 11th Light Dragoons.
Distributions of the Army and Navy, in full, &c. &c. With all the Naval and Military Intelligence of the Month.
Henry Colburn, Publisher, 13, Great Marlborough-street.

THE DUBLIN UNIVERSITY MAGAZINE for SEPTEMBER, price 2s. 6d., contains:—1. Lord Roden's Committee on Crime in Ireland—2. Confessions of Harry Lorrequer: Chap. XXXVIII. The Two Letters; Chap. XXXIX. Mr. O'Leary's Capture; Chaps. XL. and XLI. The Journey; Chap. XLII. A Reminiscence of the East—3. Allison's French Revolution—4. The Polish Journal of Française Krasinska, Part III.—5. New Zealand—6. The Man on the Mast—7. Sonnets: The Dawn; Morning and Evening; Summer Sonnets—8. Australian Emigration Society—9. Irish Political Novels: The Manor of Glenmore—10. Sketch of the Life of the late Sultan Mahmoud—11. Passage in a Spirit's History; by E. M. H.—12. Lines by E. M. H.—13. Legends and Tales of the Queen's County Peasantry: No. I. The Banshee—14. Critical Notices of Books.
Dublin: William Curry, jun. & Co.; Samuel Holdsworth, London. Sold by all Booksellers in the United Kingdom.

TAIT'S EDINBURGH MAGAZINE for SEPTEMBER, price One Shilling, contains,—Captain Marryat's America—Scenes Abroad and Thoughts at Home—Autobiography of an English Opium Eater, No. XVI.—Recollections of Grasmere; and Story of George and Sarah Green—Feast of the Poets, for September—Blanche Delamere, by Mrs. Johnstone—Literary Register: Dr. Lang on New Zealand—Sir James Clark—Bowring's Minor Morals, &c. &c.—Political Register.
William Tait, Edinburgh; Simpkin, Marshall, & Co. London; and John Cumming, Dublin.

Just published, price One Shilling, No. I. of
THE POLYTECHNIC JOURNAL; a Magazine of Science and the Fine Arts.—*Contents*: The Proceedings of the British Association—The Royal Academy—Old and Young Masters—The Revival of the Renaissance and Elizabethan Styles—Works of Art in Progress—Ancient and Modern Pictures—The Astronomy of the Book of Job, by J. Landseer, Esq.—Pretenders to the British Throne—National Music of Scotland, by George Hogarth, Esq.—State of Art in Ireland—Foreign Art—Bust of Mr. Clarkson—School of Design—Parliamentary Report on the Bude Light—College for Civil Engineers—An Essay on Life Assurances, Annuities, and Reversions—On the Conductibility of Heat in Metals—On the supposed Influence which the Roughness or Smoothness of Surfaces exercises upon the Emissive Power of Bodies—On the Construction of Railway Carriages—with a great variety of Reviews of Books, Prints, Exhibitions, &c.—Published at No. 13, Wellington-street North, Strand; and sold by all Booksellers and Newsvenders in Town and Country.

Opinions of the Press.
"In these times, when every description of liberal knowledge is so generally cultivated, such a publication ought to be eminently successful; especially when, as appears to us to be the case in the present instance, it is under the direction of judgment and taste."—*Morning Chronicle.*
"This is a new candidate for public favour, and a most deserving one. We have much wanted an organ for fair and unbiassed criticism in art, and for candid, clear, and familiar instruction in Science, and the *Polytechnic Journal* seems to hit both marks. We are glad, too, to discover in it a spirit of independence, and an internal evidence of not being under the immediate influence and control of quacks in the department of Science, or of publishers in that of Art. We have to congratulate those who devote themselves to Science and Art, upon the appearance of the *Polytechnic Journal*."—*Morning Post.*
"This Periodical is likely to become a successful one. The information it contains is not only various and valuable, but the low price at which the journal is published offers an additional argument in its favour. The comments on art are written in very good taste; and in an article entitled 'Pretenders to the British Throne,' there is an unanswering-up of the thousand and one different *likenesses* of her Majesty which have flooded the country since her accession. The scientific notices are extremely well written. We predict a very prosperous career to the *Polytechnic Journal*."—*Morning Herald.*
"We hail the appearance of the *Polytechnic Journal*, not only with cordial wishes, but with a strong confidence in its prospect of success. It wears a handsome and liberal aspect, and contains 'more for money' than any of its established contemporaries. This would be no real recommendation, unless we could vouch for the quality as well as the quantity of the contents—and this we can do. The work takes up a vacant ground, and fills it with every promise of ability and proportioned benefit both to Art and Science. All the subjects are well chosen, and as well treated."—*Courier.*

This day, price 5s. post 8vo. cloth, a
MANUAL for MECHANICS' INSTITUTIONS. Published under the Superintendence of the Society for the Diffusion of Useful Knowledge.
London: Longman, Orme & Co.; and at the Society's Office, 59, Lincoln's Inn-fields.

This day is published, price 10s.
A TREATISE on DIFFERENTIAL EQUATIONS, and on the CALCULUS of FINITE DIFFERENCES. By J. HYMERS, B.D.
Fellow and Tutor of St. John's College.
Cambridge: J. & J. J. Deighton. London: J. G. & F. Rivington.

Just published, price 4d.
AN ACT for the further Regulation of the Duties of POSTAGE until the 5th day of October, 1840, for giving effect to the PENNY POSTAGE PLAN, proposed by Rowland Hill. With Notes and Explanations.
H. Hooper, Postage Depôt, 13, Pall Mall East.

New Edition, to be completed in 10 volumes.
LIFE of SIR WALTER SCOTT. Vol. VI.
The following uniform, with 196 Engravings:
Waverley Novels. 48 vols.
Scott's Poetry. 12 vols.
Prose Writings. 28 vols.
Robert Cadell, Edinburgh; Whittaker & Co. London.

TO SCHOOLS AND STUDENTS IN DIVINITY.
Just published.
A GUIDE to the STUDY of the PENTATEUCH; being a Series of Questions on the five Books of Moses; with References to Works in which Answers may be found; intended for the higher Classes in Schools, and for Students in Divinity.
By J. THOMPSON, M.A. St. John's College, Cambridge, And Second Master of the Blackheath Proprietary School.
12mo. price 4s. 6d. cloth.
Houlston & Stoneman, 65, Paternoster-row, London.

Just published,
MONUMENS ÉGYPTIENS du Musée d'Antiquités des Pays-Bas, à Leide, publiés par
Dr. C. LEEMANS.
Première livraison, 18 Plates in folio, and the Text in 8vo.
To Subscribers, 2*l*.
Also, by the same Author,
Lettre, &c. sur les Monumens Égyptiens portant des Légendes royales, &c. 8vo. with 32 Plates. 1838. Price 13s. 6d.
London: Black & Armstrong, 8, Wellington-street North.

WORKS BY THE AUTHOR OF 'THE PEEP OF DAY.'
Now ready, a New Edition,
LINE UPON LINE; or, a Second Series of the Earliest Religious Instruction the Infant Mind is capable of receiving. With Verses illustrative of the Subjects. In Two Parts, price 2s. 6d. each Part; forming a Sequel to the 'Peep of Day.'
Lately published, by the same Author,
2. The Night of Toil; or, a Familiar Account of the Labours of the First Missionaries in the South Sea Islands. In 1 vol. duodecimo, cloth, price 6s., with Engravings.
3. The Peep of Day; or, a Series of the Earliest Religious Instruction the Infant Mind is capable of receiving. With Verses illustrative of the Subjects. The Fifth Edition, with a new series of Engravings. 18mo. cloth, price 3s.
J. Hatchard & Son, 187, Piccadilly.

LOWNDES' BRITISH LIBRARIAN; or, Book-Collector's Guide, Part 4, will be ready with the Magazines for September.
Whittaker & Co. Ave Maria-lane.

In 12mo. price 6s. in boards, a new edition of
MEMORIALS of a DEPARTED FRIEND.
"She being dead, yet speaketh."—Heb. xi. 4.
J. G. F. & J. Rivington, St. Paul's Churchyard, and Waterloo-place, Pall Mall.

BRITISH ASSOCIATION.
Just published, with 17 Plates, price 15s.
THE REPORT of the EIGHTH MEETING of the BRITISH ASSOCIATION for the ADVANCEMENT of SCIENCE, held at Newcastle in August, 1838.
John Murray, Albemarle-street.

This day, price 1s. 6d.
REPLY to MR. LOCKHART'S PAMPHLET, entitled 'The Ballantyne Humbug Handled.' By the Authors of 'A Refutation of the Misstatements and Calumnies contained in Mr. Lockhart's Life of Sir Walter Scott, Bart., respecting the Messrs. Ballantynes.'
London: Longman, Orme & Co. Edinburgh, A. & C. Black.

Now ready, Fourth Edition, corrected and much improved, small 8vo. 10s. 6d.
ON the CONNEXION of the SCIENCES.
By MARY SOMERVILLE.
"Mrs. Somerville's delightful volume on the 'Connexion of the Sciences.' The style of this astonishing production is so clear and unaffected, and conveys, with so much simplicity, so great a mass of profound knowledge, that it should be placed in the hands of every youth, the moment he has mastered the rudiments of education."—*Quarterly Review.*
John Murray, Albemarle-street.

This day is published, in foolscap 8vo. price 5s. illustrated with a Portrait and Vignette,
VOLUME FOURTH OF
THE WORKS OF MRS. HEMANS.
Contents: The Forest Sanctuary—Lays of Many Lands—Miscellaneous Pieces—Dartmoor (a Prize Poem)—Welsh Melodies—Hymns for Childhood—De Chatillon, or the Crusaders; a Tragedy—Miscellaneous Pieces.
William Blackwood & Sons, Edinburgh.

Just published, with Two Plates, price 18s. The
PHILOSOPHICAL TRANSACTIONS of the ROYAL SOCIETY, for 1839, Part I.
Sold by R. & J. E. Taylor, Red Lion-court, Fleet-street.
Where may be also had,
The Catalogue of the Scientific Books in the Library of the Royal Society, price 15s. 8vo. As also,
The Abstracts of the Proceedings of the Royal Society. 3 vols. 8vo. price 1*l*. 2s. 6d.

This day is published, in 1 vol. fc. 8vo. 8s. the 3rd edition, of
ESSAYS on NATURAL HISTORY, chiefly ORNITHOLOGY. By CHARLES WATERTON, Esq., with an Autobiography of the Author, and a view of Walton Hall. 3rd Edition, with three additional Essays not before published, viz. On the Phaeton, or Tropic Bird—on the Weasel—and on the Ass Wouralia.
London: Longman, Orme & Co.

THE LATEST WORK ON THE CANADAS.
In 3 vols. with Six Maps and Ten Engravings, 15s.
HISTORICAL and DESCRIPTIVE ACCOUNT of CANADA, UPPER and LOWER, NOVA SCOTIA, NEW BRUNSWICK, NEWFOUNDLAND, PRINCE EDWARD ISLAND, the BERMUDAS, and the FUR COUNTRIES.
By HUGH MURRAY, F.R.S.E., JAMES WILSON, F.R.S.E. R.K. GREVILLE, L.L.D., and PROF. TRAILL.
Oliver & Boyd, Edinburgh; and Simpkin, Marshall & Co. London.

HUNTING, RACING, SHOOTING, &c. &c.
On Tuesday, Oct. 1st, will be published, in 8vo. Part I. to be completed in Ten Monthly Parts, price 5s. each, of
AN ENCYCLOPÆDIA of RURAL SPORTS.
By DELABERE P. BLAINE, Esq., Author of Outlines of the Veterinary Art,' 'Canine Pathology,' &c. Beautifully illustrated with numerous Engravings on Wood, from Drawings by Alken, T. Landseer, Dickes, &c.
*** The Prospectus, with Specimens of the Illustrations, may be had gratis of all Booksellers in Town and Country.
London: Longman, Orme & Co.

SCIENTIFIC MEMOIRS, translated from Foreign Transactions and Journals. Edited by RICHARD TAYLOR, F.L.S. PART VI., Six Plates, price 6s., containing Melloni on the Polarization of Heat—Gauss's General Theory of Terrestrial Magnetism—Gauss on a New Instrument for observing the Intensity of Terrestrial Magnetism—Weber on the Use of the Bifilar Magnetometer—Schleiden on Phytogenesis.
The Translations of the Memoirs on Terrestrial Magnetism have been made under the direction and revisal of Major Sabine, Prof. Lloyd, and Sir J. F. W. Herschel, with a view to the main object of the Antarctic Expedition under Capt. J. C. Ross.
The Subscribers who have not received Part V. are requested to apply for it to their Booksellers, or to R. & J. E. Taylor, Red Lion-court, Fleet-street.

PAINTING AND MUSIC.
In post 8vo. price 6s.
PAINTING AND THE FINE ARTS.
By B. R. HAYDON and WILLIAM HAZLITT.
"Mr. Hazlitt's clever Treatise, written for the 'Encyclopædia Britannica,' has come under our notice. We have read no work of that author with anything approaching to the same gratification."—*Quarterly Review.*
"This inimitable Dissertation on Painting."—*Tait's Mag.*
"We have mentioned the gratification we have experienced from the perusal of Mr. Hazlitt's Essay; we must add a similar testimony in favour of his fellow-labourer, Mr. Haydon. His Treatise seems to us the result of study and observation extensive and profound."—*Quarterly Review.*

In a handsome volume, 4to. price 9s. with numerous Engravings, and copious Musical Illustrations interspersed with the Text,
AN ESSAY ON THE THEORY AND PRACTICE OF
MUSICAL COMPOSITION,
with an Appendix and Notes, being an extension of the article 'Music.' By G. F. GRAHAM, Esq.
"A masterly and comprehensive Essay."—*Athenæum.*
"We never saw so much sound practical information on the subject compressed into the same space."—*Spectator.*
"A lucid and harmonious arrangement of the principles of the art."—*Musical World.*
Adam & Charles Black, Edinburgh;
Simpkin, Marshall, & Co.; Whittaker & Co.; and Hamilton, Adams, & Co. London.

LONDON, SATURDAY, SEPTEMBER 7, 1839.

REVIEWS

The Life and Times of Sir Thomas Gresham, &c., including Notices of many of his Contemporaries: with Illustrations. By John William Burgon. 2 vols. Jennings.

We have been much pleased with these volumes, and none the less because the interest they excite is thoroughly English. As regards the private character and domestic history of the founder of the Royal Exchange, this biography is, indeed, nearly as bald and conjectural as Godwin's 'Life of Chaucer;' but, in what concerns his mercantile career, Mr. Burgon is minute and explicit—seasoning his details with anecdotes and traits of character of the age and contemporaries of Sir Thomas Gresham, aided by a mass of letters and documents—Gresham's private correspondence—which he disinterred from among the treasures in the State Paper Office. Though Sir Thomas himself never condescended to gossip in his letters, which are strictly letters of business—grave, plain-speaking, with occasional touches of deferential courtiership, when the Maiden Queen or Cecil is the party addressed—some of his assistants were more discursive, and made the most of the news of the day. Thus, besides the selections judiciously made by Mr. Burgon from works already published, there is a fresh store of amusement to be found in his volumes, and a character or two, "not to be had elsewhere," which the reader will contemplate with pleasure.

Let us begin, without further preamble, with the date of Sir Thomas Gresham's birth, which Mr. Burgon notices, as probably having taken place in London in the year 1519. The family—originally belonging to Norfolk—was one of some substance, and already distinguished in the mercantile world: Sir Richard Gresham, the father of our hero, had been elected Lord Mayor of London in the year 1537, and in this capacity showed himself to be a man of benevolence and discretion, though somewhat subservient, we fear, to the Court. "He was familiar with" Lord Crumwell, the Privy Seal, and Audeley, the Chancellor—and was mentioned by Wolsey on his death-bed, as his friend. During his mayoralty too, he endeavoured to draw the attention of government to the expediency of establishing a "Burse" for the transaction of commercial business, similar to the one recently erected at Antwerp—which was then a Tyre among the merchant-cities. Five successive royal grants of church lands were bestowed on him; one, it is to be feared, in return for services rendered as sheriff, on the occasion of James Bainham's martyrdom. He made two reputable marriages, and lived in more than ordinary state and luxury. The way of the father was trodden by his more illustrious son; and we have dwelt upon it, because Mr. Burgon is obliged to acknowledge, that of the youth of the latter "we know nothing"—"except that he had the misfortune to be deprived of a mother's care at the tender age of three years; and that he was subsequently sent to Cambridge, and admitted a pensioner of Gonville Hall:"—

"It was, perhaps, not so much inclination as expediency," says Mr. Burgon, "which made him a merchant. But the advantages to be derived from foreign commerce were then so considerable, that with the splendid examples of his father and uncle before him, it can be no matter of surprise that he was induced to forsake a quieter walk of life, for one of honour and emolument. His father evidently destined him for commercial pursuits, by binding him in his youth apprentice to his uncle Sir John Gresham; in consequence of which he was, in 1543, admitted a member of the Mercers' Company, being then in the twenty-fifth year of his age. Ten years afterwards, writing to the Duke of Northumberland from Antwerp concerning commercial matters, he says, 'To the wyche syence I myselfe was bound prentisse viii yeres, to come by the experyence and knowledge that I have. Nevertheless I need not to have bynne prentisse, for that I was free by my father's coppye: albeit, my Father Sir Richard Gresham being a wise man, knew, although I was free by his coppye, it was to no purpos, except I were bound prentisse to the same; whereby to come by the experience and knowledge of all kinds of merchandise.' This may be as proper a place as any other to mention, that my reading has led me to quite a different conclusion respecting the estimation in which merchants were formerly held, to that entertained by the elegant author of 'Illustrations of British History.' Mr. Lodge considers that the nobility of other days kept themselves at a distance from even the first members of the commercial order: but I believe the contrary will be established by the following pages. What is strange, the nobles appear among the most enterprising speculators, and were themselves traders on the grandest scale. In Queen Mary's reign, for instance, when the Muscovy merchants were incorporated, (that is to say, the first English company which traded to Russia,) the most powerful of the nobility stand foremost in the list of members. The Earls of Leicester and Shrewsbury sent out joint-adventures to Muscovia in 1574; on which occasion the first-named peer writes to his friend, 'I assure you yf I had had 10,000*l.* in my purse, I wold have adventured yt every peny myself.'"

In 1543, we find Seymour and Wotton mentioning him in their despatches to King Henry, from Brussels, as "*Yonge* Thomas Gresham," to whom was intrusted a licence for the gunpowder and saltpetre purchased for the English government; and, in 1545, upon the occasion of Charles V. having arrested some merchandise by way of reprisal for a seizure of Flemish ships, suspected of carrying assistance to the French; he, with his father, is mentioned as a party likely to gain by the seizure, "with such other for the most part that occupy sylkes." These are but fragmentary notices of six and twenty years of a mans life—years, too, comprising that step, which is more important to his weal or woe, than even the choice of his profession, namely, his marriage. But of this, too, Mr. Burgon has nothing to tell, save that the chosen lady was "Anne, the daughter of William Ferneley, esq., of West-Creting, in Suffolk, and widow of William Read, a gentleman of good family."

About the year 1551, we begin to trace Gresham's progress more clearly. That he must have earned for himself a reputation for intelligence is proved by his being among the merchants sent for by Edward VI., to consult with the young monarch's counsellors on the best means of settling the King's financial transactions at Antwerp, which had been brought into disorder and entanglement by the dilatory habits of Dansell, the Royal Agent, otherwise styled the King's Merchant or Factor:—

"I was sent for," says Thomas Gresham, "unto the counsell, and brought by them afore the King's Majestie, to knowe my oppynyone (as they had many other marchaunts) what waye wythe leaste charge his majestie might growe out of debt. And after my devise was declared, the King's highness and the counsell required me to take the room in hande, wytheout my sewte or labour for the same."

Though Gresham's father and uncle had been repeatedly employed by the Crown as domestic financial agents, he was the first who was appointed Royal Agent. Mr. Burgon gives the following account of this office:—

"The office of Royal Agent, or as it was sometimes called King's Merchant, or Factor," says our author, "was of very early origin. It naturally arose out of the exigencies of an imperfectly organized system of finance; which, when the country was threatened with war, or some other source of heavy expenditure, recognised but two modes of replenishing the coffers of an impoverished treasury; viz. to levy subsidies by an unjustifiable stretch of arbitrary power,—or to induce wealthy merchants, under sufficient security, to advance the sums required. The former of these methods, which in remote times was doubtless had recourse to in the majority of instances, and with most success, was too convenient ever to be totally relinquished: but as the commercial wealth of Europe increased, the practice of obtaining loans from the opulent merchants settled in Germany and the Low Countries became more and more prevalent; until it was finally found expedient, on the part of government, to employ an agent for the express purpose of negotiating them. This was always some one of high ability, influence, and integrity, whose province it was, in addition to the immediate duties of his office, to supply the state with whatever was required of foreign production. It was also expected of this servant of the crown, that he should keep the privy-council informed of whatever was passing abroad; and he was not unfrequently called upon to negotiate with foreign princes in the additional capacity of ambassador. The office of 'agent for the crown, with the trading interest, or as it is called King's Merchant,' says an elegant modern writer, 'was one of the highest importance and trust; inasmuch as it united the duty of raising money for the royal occasions by private loans, with that of protecting and cherishing the sources from which they were derived.' It is to be observed, that this office was distinct in itself, and altogether independent of the occasional employment of one or more domestic financial agents. It is from a misapprehension on this head, that so many erroneous statements have been circulated relative to the father of the subject of this memoir. One of the earliest merchants who enjoyed this appointment was William de la Pole, father of Michael, Earl of Suffolk. In 1338, he lent Edward III., at Antwerp, a sum equivalent to at least 400,000*l.* of our money; on which, in addition to several grants of crown lands, he was created Chief Baron of the Exchequer and a Knight Banneret. He is styled 'dilectus mercator et valectus noster' in all public instruments; and in 1389 was succeeded in the same capacity by his son Michael, who dwelt in his father's house in Lombard-street, near Birchin-lane. The latter died at the siege of Harfleur in 1415, and was succeeded by his son, another Michael, who fell at Agincourt. It would not be an uninteresting subject of inquiry to trace the successive occupants of this office, after it went out of the De la Pole family, until the reign of Henry the Eighth; when the duties of Royal Agent had devolved to Stephen Vaughan, much of whose MS. official correspondence, extending from 1530 to 1546, may be found in the British Museum. It is a circumstance deserving of notice, however, that neither Vaughan, nor any other individual who filled this office, enjoyed it to the same extent as Sir Thomas Gresham."

Elsewhere, Gresham states that he owed his preferment to Dudley, Duke of Northumberland. The "diets" or salary belonging to this important appointment, was twenty shillings *per diem*. Gresham was already familiar with Antwerp—and not wholly a stranger, it may be presumed, to the particular duties required of him, having been already employed there as a domestic financial agent in the service of the Crown. He now became a permanent resident in that rich and prosperous city, taking up his abode under the roof of Jaspar Schetz, who was not only a man of distinguished family, and the factor to the Emperor Charles V., but one who had cultivated the "humanities,"—a poet and a scholar. The narrow and vulgar notions held westward, that a city merchant *could not*—and eastward, that he *ought not*, to be a patron of art, and a gentleman, were of a later date. Gresham's earlier transactions at Antwerp, in his official capacity, called for much firmness and discretion. It had been a practice with the money-lenders there, to compel their royal debtor, Henry VIII., to renew his bonds on terms the most unjust; and not only to pay interest upon them in English money, when the exchange was reduced to sixteen shillings Fle-

mish to the pound sterling—but also, by way of bonus, to compel him to take such jewels and wares as they chose to thrust upon him. The following curious example is from the MS. journal of Edward VI.:—

"[1551, April,] '25. A bargaine made with the Fulcare for about 60,000*l.* that in May and August should be paid, for the deferring of it. First, that the Foulcare should put it off for ten in the hundred. Secondly, that I should buy 12,000 marks weight, at 6 shillinges the ounce, to be delivered at Antwerpe, and so conveyed over. Thirdly, I should pay 100,000 crounes for a very faire juel of his, four rubies marvellous big, one orient and great diamount, and one great pearle.'"

In addition, the King's agent had, on these occasions, to "make a banckett to all his Majestie's creadytters." One such entertainment for only twenty people, cost the large sum of 20*l.*, equivalent to about 250*l.* of our money. Another was commemorated in a picture, which, on Sir Christopher Blount's attainder, was valued at a higher rate than two pictures of my Lord of Leicester, with portraits of 'Julius Cæsar,' 'Penelopey,' 'The Queene of Hungarie,' and 'Fryer Bacon,' thrown into the bargain. It is impossible to notice Gresham's progress, negotiation by negotiation; enough to say, that during the reign of Edward VI., it steadily tended upward towards prosperity and distinction. For many years it was carried on, at the expense of much personal fatigue and exertion—gradually, however, as his connexions and influence extended, we find mention not only of his special messengers, but of his agents: the foremost among the latter, being one Richard Clough, who subsequently took his place as permanent resident at Antwerp; and whose letters form the most amusing portion of these volumes. How highly Gresham was prized by King Edward, may be gathered from the grant of lands in Norfolk, worth one hundred pounds a year, bestowed but three weeks before his Sovereign's death, with the encouraging words, "You shall know that you have served a King." This was not the only instance in which Gresham experienced the liberality of Edward—Westacre Priory, in Norfolk, which was of much greater value, had already been given to him.

On the accession of Mary, Gresham's prosperity seemed for one moment to totter. He was superseded in his agency, being "personally obnoxious on the score of his religious opinions, and having a bitter enemy in Gardiner, Bishop of Winchester." But he laid a plain and honest memorial of his past claims and services before the Court, and by some means, obtained the intervention of a Sir John Legh, whose influence with the Queen must have been great; witness notices in the life of Cardinal Commendone, and again in the despatches of Noailles. This, joined with the manifest inefficiency of one Dauntsey, who had been appointed his successor, led, ere long, to his reinstatement.

In 1554, Gresham was sent to Spain, but unfortunately, of the letters written in that country, only one has been discovered, and that one is of little importance. The letters on his return to Antwerp, touch occasionally on rumours of domestic matters of some interest. The report of Wyatt's rebellion appears to have frightened the English merchants, who, however, soon after rejoiced in the strange story of the birth of a Prince. On this subject, Mr. Burgon remarks:

"The extraordinary supposition that the queen was about to become a mother, when she was in truth afflicted with dropsy, did not fail, before it reached Antwerp, to assume the serious form of an actual occurrence: nor could less have been expected, after the great pains which had been taken at home to fill the public mind with expectations of an heir to the crown. Gresham writes thus to the lords of the council on the 4th of May, 1555:—'It maye please your most honnorable Lordeships to be advertised that as the ii^nd^ of this present, here came newes along the seas by men of this country, that the Queene's Majesty was brought a-bed of a yonge Prynce, the last of April; whiche newes contynewed here til the iiii^th^ day. And as the thyrde day, the Regent, being in this town of Andwerpe, about 7 of the clocke at night, dyd cause the great bell to ringe, to give all men to understand that the news was trewe. Signifying unto your honnors, that as the ii^nd^ day, upon the aryvall of the fyrst newes, the Quene's highness' mere merchants, according to their most boundyd dewtye, caussyd all our Inglishe ships to shoote off with such joy and triumph as by man's art and pollisey could be devysed, in the presence of the Regent, with all her nobills and gentilwomen. Whereupon the Regent presently sent our Inglishe maroners one hundred crowns to dryncke. Trusting in God the newsto be trewe; for as yet, I, nor none of our nacion hath no certayne wryting thereof.' Notwithstanding a certain degree of concern which this passage in Queen Mary's history excites, there is something irresistibly ludicrous in the accounts transmitted to us of the extent to which the delusion alluded to was indulged. 'All the court,' says Grafton, 'was full of midwives, nurses, and rockers; and this talk continued almost half a year, and was affirmed true by some of her physicians, and other persons about her; which seemed both grave and credible. Insomuch that divers were punished for saying the contrary.' On the 3rd of May the Bishop of Norwich received 'the sodeine good newes of the Quene's Highnes moost joyfull deliverance of a nooble Prince: whereupon, to laude God, *Te Deum* was solemply sung in the Cathedrall Churche, and other places of the cytye [of Norwich], wyth woonderfull joye and muche gladness of all people throughowte all the whole cytye and the countrye thereabowtes.'—'The parson of Saint Anne within Aldersgate,' says Foxe, 'after procession, and *Te Deum* sung, took upon him to describe the proportion of the child; how faire, how beautiful, and how great a prince it was, as the like had not been seen.' But by far the most extraordinary circumstance connected with this delusion has never yet been noticed in print. There is in the State-Paper Office an original letter to Cardinal Pole, *signed by Philip and Mary, announcing the birth of a Prince* as an event which had already occurred. 'Whereas it hath pleased Almighty God of his infinite goodnes to adde vnto the great nomber of other his benefites bestowed vpon vs, the gladding of vs with *the happy deliverie of a prince.*' The date is left blank, but the letter is endorsed '29th May, 1555.'

Gresham was a personal favourite of Queen Mary's, and received many substantial proofs of it. But he was obnoxious to the Lord Treasurer, and appears, during Mary's reign, to have been rather frequently than permanently employed as royal agent. Yet we find him in attendance at the first Council of her successor, and from that time his fortune "knew no ebb"—but we must here pause for the present.

A Word to the Belgians—[Un Mot aux Belges, &c.] By the Hon. W. L. Wellesley. Brussels.

Mr. Wellesley has lived a long time under the hospitable protection of the Belgian government, and he has written this pamphlet in part payment of the debt of gratitude thus contracted. But everything in these days must be governed more or less by an *arrière pensée;* and accordingly we have a secondary motive for the production, in the desire, on the part of the author, to make public his profession of faith, as one who is likely, ere long, in the progress of nature, to take his rank among the hereditary legislators of his country. We rarely venture on the field of politics,—still more rarely into that of foreign politics; and we see nothing which should tempt us to depart from this rule in the present instance. We shall, therefore, confine ourselves to observing, that a pamphlet, on Belgian domestic affairs, written in French, does not afford the most likely means of obtaining a hearing from the British public, and thence to infer that the last half of the writer's intentions must be transmitted to the commissioners for paving that place, where, instead of old-fashioned granite, new-fashioned asphalte-bitumen, or newest-fashioned wooden blocks, they make their highways with the abortive designs of benevolent humanity. In dealing thus shortly with the work, we by no means intend to insinuate an opinion unfavourable to its merits; still less are we influenced by a discourteous feeling to the author. To the Belgians, probably, Mr. Wellesley's opinions may prove interesting, and there are some of them worthy their attentive consideration, though, perhaps, *sunt bona, sunt mala plura;* few, however, of our readers would trouble themselves to read our reasons, should we give them, for this opinion. To the Belgian journalists, therefore, we leave the fuller consideration of the few pages thus addressed to them, with a hearty wish for the prosperity and permanence of their infant nationality.

Sinai—[Quinze Jours au Sinaï]. By A. Dumas and A. Dauzats. Paris, Dumont; London, Dulau.

The '*Impressions de Voyage,*' of M. Dumas, of which the present work is a continuation, are lively and graphic sketches, dashed off on the impulse of the moment, and remarkable rather for force than fidelity. Still the truth is generally discoverable; and this arises, in degree, from his testing everything by one invariable standard—Parisian fashion: the Palais Royal is to him what the Salt-market was to Baillie Nichol Jarvie, it furnishes the weights and measures by which all things are estimated. This is undoubtedly an advantage, for the reader can always reduce the sentiment of M. Dumas to the current value of his own national opinions, by simply working out the rule of proportion. What has here been said of the former '*Impressions*' is equally true of the present; it is not a work deserving of formal criticism; but we shall select a few passages and submit them as amusing problems to be reduced into English currency by our readers.

Dumas gives an account of his adventures on first landing at Alexandria:

At the very port, donkey-drivers wait for travellers, like the hackney-coaches and cabriolets on the stands of Paris. In fact, they are everywhere; at the square tower, Pompey's Pillar, Cleopatra's Needle; and, it must be confessed, that they surpass our coachmen and cads in foresight and tenacity. Before I had time to make selection, I was seized, carried off, placed astride on a donkey, whipped off, hurried on to another, tumbled from that on to the sand, amid shouts and blows exchanged so rapidly that I had not time to offer the least resistance. I profited by the moment of respite which the battle over my prostrate body afforded to look around me and I perceived that Mayer was in a still more criti, cal position; in fact, he was a prisoner, and, in spite of his entreaties, was carried off at a gallop by the donkey and its driver. I ran to his aid, and succeeded in rescuing him from the infidel; we then hurried down the nearest lane to hide ourselves from this eighth plague of Egypt; but we were soon overtaken by our tormentors, who, for greater speed, had mounted their quadrupeds, and thus had over us all the advantages of cavalry over infantry. I do not know how matters would have ended this time, if some good Moslems, recognizing us as Franks by our dress, had not taken pity on us, and, without saying a word, or even warning us by gesture of their good intentions, come to our rescue, and put our officious assailants to flight with heavy blows from hippopotamus thongs.

The muddy streets soon compelled M. Dumas to accept the services of the despised donkey-drivers, and no sooner was he mounted than he began to philosophize:—

Everything was to us Parisians an object of surprise; social and physical order seemed reversed; the earth and sky were strange to us; the language had no analogy to any other; the manners were peculiar to the country. With us, people wear their

hair and shave their beards; the Mussulmans shave the head and let the beard grow. We punish bigamy, and censure concubinage; they sanction the one, and set no bounds to the other. Woman, in our social system, is a wife, a sister, a friend; in theirs she is only a slave, and the most wretched of all slaves; her life is that of a prisoner; no one but her master approaches her habitation; the more lovely she is, the more wretched is her life; her existence is suspended by a thread; if she raises her veil her head rolls in the dust.

M. Dumas devotes an entire chapter to the description of his sufferings on his first trial of an eastern bath. The subject wants novelty; still a few passages from this extravaganza may amuse the reader, and he may contrast them with Mr. Stephens's account of a Russian bath (*Athen.* No. 583).

Scarcely had I entered, when two strong men belonging to the bath laid hold of me, and, in an instant, I was stripped to the skin. One of them then passed a linen shawl around my waist, while the other fastened on my feet a pair of gigantic pattens, which at once made me a foot taller. This mode of shoeing not only rendered flight impossible, but, by its clumsy elevation, destroyed my equilibrium; and I should inevitably have fallen, had not the two men supported me on either side. I was fairly caught. We passed into another room; here the vapour and heat stifled me. I thought that my guides had mistaken the way, and got into an oven. I tried to shake them off, but my resistance was anticipated. In a few moments I was astonished at perceiving that, as the perspiration poured from me, my lungs began to dilate, and my respiration returned. In this state I passed through five or six rooms, the heat of which increased so rapidly that I began to believe that man had for five thousand years mistaken his proper element, and that his appropriate destiny was boiling or roasting. At last we came to the stove-room. There the fog was so dense that I could not see two steps before me, and the heat so entirely insupportable that I partly fainted. I shut my eyes, and resigned myself to my guides. After leading, or rather carrying me a few steps further, they took off my girdle, unhooked my pattens, and extended me, half swooning, on something like a marble table in the middle of the apartment. Here, again, I soon became accustomed to the infernal atmosphere. With my other senses, my sight revived; and, despite the fog, I made out with tolerable accuracy the surrounding objects. My tormentors seemed to have forgotten me for a moment: they were busy at one side of the room. I lay in the centre of a large square saloon, incrusted, to the height of five or six feet, with variously coloured marbles; a series of spouts threw out incessantly streams of steaming water, which, falling on the pavement beneath, glided thence into four basins, like cauldrons, at the four corners of the room. On the surface of the water in these basins was an indefinite number of bald heads bobbing about, and expressing, by the most grotesque contortions of face, various degrees of felicity. This spectacle so occupied my attention, that I scarcely heeded the return of my masters. They came, however; one with a large wooden bowl of soap-suds, the other with a ball of fine flax. Suddenly one of the rascals inundated my face and neck with his suds; and the other, seizing me by the shoulder, rubbed most furiously my face and breast with his flax. This treatment and the pain induced by it were so perfectly intolerable, that all my powers of resistance and resentment waked at once. I bolted upright, kicked my flaxen friend half across the room, and planted my fist in the face of soap-suds with such good-will that he lay sprawling on the floor. Then, knowing of no other remedy for the soap, (which was blistering my skin,) I boldly plunged into the larger basin. I had misjudged; the remedy was worse than the disease. Before, my face and neck were cauterized, now, my whole body was scalded: the water was boiling! I yelled with pain; sprang on and over my neighbours, who could not comprehend my case; and got out of the tub *almost* as rapidly as I got in. However, I was not rapid enough to escape the effect of the ablution: my body was as red as a lobster. I was stupified! I must be dreaming, or riding a night-mare. Yet there was no deception. Here, under my very eyes, were men stewing in a broth of which I had *tried* the temperature, who evidently took great delight in the operation. What could it mean? My notions of pleasure and pain became confused: they could *enjoy* what to me was *agony!* I once more resolved to resign myself to fate. I doubted my own judgment. I distrusted my own senses. I determined, again, to submit to my tormentors. They came, having recovered from my assault. I followed them without resistance to another basin. They made signs to me to descend the steps: I obeyed. * * From this I passed to another of a higher temperature, but still supportable. I remained in it, as in the first, about three minutes. I then proceeded to the third, which was still some ten or twelve degrees hotter; and, finally, reached the fourth, where I had commenced my hellish apprenticeship. I approached it with the greatest repugnance, but I had made up my mind to go through with my desperate adventure. I first dipped my toe in the water: it was hot, certainly; but not so scalding as before. I gradually immersed my whole body, and was surprised to find it endurable. * * My attendants now again took me in hand. They replaced the linen around my waist, bound a shawl on my head, and led me back through the rooms by which I had entered (taking care to add to my covering at each change of atmosphere) until I arrived at the chamber where I was so unceremoniously stripped. Here I found a good carpet and pillow. My turban and girdle were taken off; I was enveloped in a large woollen gown, laid down like an infant, and left alone. I had now an undefinable feeling of comfort. I was perfectly happy; yet, so exhausted, that when the door was opened, half an hour after, I had not changed my position by the movement of a finger or a muscle. The new comer was a sinewy and well-set Arab. He approached my couch as if he had some business with me. I looked on him with a sort of dread very natural to a man who had passed such an ordeal as I have described; but I was too weak to attempt to rise. He took my left hand; cracked all its joints, and did the same to the right. After my hands, he administered upon my feet and knees; and, to finish the matter, he dexterously threw me into the position of a pigeon-to-be-broiled, and gave me the *coup de grâce* by cracking the vertebræ of my spine. I screamed with terror, thinking my back-bone was broken, to a certainty. My *masseur* then kneaded my arms, legs, and thighs for a quarter of an hour, and left me. I was weaker than ever; my joints all pained me, and I had not strength sufficient to cover myself with the carpet. A servant now brought me coffee, pastiles, and a pipe; and left me to intoxicate myself with perfume and tobacco. I passed half an hour in a drowsy state, lost in the vagaries of a delicious inebriation, experiencing a feeling of happiness before unknown, and entertaining a supreme indifference to every (absent) earthly thing. I was awakened from this by a barber, who shaved me, and combed my whiskers and moustaches. Next, my Arab returned, to whom I made signs that I wished to depart. He brought my clothes, assisted me in my toilet, and led me to the chamber opening on the vestibule, where I found my cloak. The cost of this entertainment, which lasted three hours, was a piastre and a half, or eleven sous of our money.

M. Dumas now proceeded to Rosetta, and embarked for Cairo. There he and his friend established themselves at an European hotel in the Frank quarter, and looked forward with pleasure to a night of refreshing repose; but they reckoned without their host, or rather hosts: rats have become the eleventh plague of Egypt, scarcely less tormenting than any of the ten inflicted by Moses:—

Notwithstanding the superiority of couches over divans, my nerves were so shattered by the infernal music with which we had been regaled, that I could not sleep. Soon, a strange physical cause was superadded to the nervous agitation which kept me awake. I felt animals, which I could not distinguish in the dark, jumping and running over my bed, I tried to catch one of them, but they eluded me with a cleverness and sagacity which proved that they had considerable practice in this kind of exercise. During a moment of quiet, I heard Meyer, who lay at the other end of the room, engaged in the same chase. There was no longer room for doubt; it was a regular and combined attack: having mutually consulted on our position, we supported ourselves on our bolsters, in order to protect the rear, and commenced a regular defence. But words and deeds were powerless: like the Mameluke—

> Who charges, combats, flies, and then returns
> To charge, to combat, and to fly again,—

our enemies were unscizable. I made a sortie into the ante-chamber, where a lamp was burning, and immediately returned with a light. If we could not touch our antagonists, at least we could see them; they were enormous rats, as old and as fat as patriarchs; at the sight of the lighted candle they took to their heels in the greatest disorder, and with cries of terror, effecting their retreat under the door, which did not reach within four inches of the threshold. We employed our engineering skill in devising a plan for raising a barricade; and after several plans had been proposed and abandoned, I saw that the time was come for an act of heroic devotedness, and, Curtius like, I sacrificed my coat to fill the chasm. Scarcely was the barrier fixed, the light extinguished, and we in bed, when the siege was renewed. But this time we were secure. I had put a great coat under the door at night, in the morning I took out a spencer; the skirts had disappeared; they were the *spolia opima.*

Cairo and the Pyramids have been so often described that we cannot waste space on the reports of so hurried a traveller; the reader must therefore prepare to traverse the Desert. The first day brings us to the forest of petrified palms:—

The ground was covered with the trunks of palm-trees; it seemed as if an entire forest had been petrified while standing, and that the simoom, sweeping the naked sides of the Mokkatan, uprooted the trees of stone, which had broken as they fell.—For more than half a league we traversed these strange ruins, which, from their prostrate and truncated columns, might at first sight be readily mistaken for some unknown Palmyra.

They proceed onwards by the accustomed route, which, M. Dumas says, is marked by a white line of bleached bones extending to the horizon:—

This extraordinary circumstance, it may well be supposed, aroused all my attention. I called to Bechara, who, however, did not wait for my question, for he at once read my desire in my obvious astonishment. "The dromedary," said he, coming to my side, and commencing his story, without preface, "is not so troublesome and importunate an animal as the horse. He continues his course without stopping, without eating, without drinking; nothing about him betrays sickness, hunger, or exhaustion. The Arab, who can hear from such a distance the roar of a lion, the neigh of a horse, or the noise of men, hears nothing from his *haghin*, but its quickened or lengthened respiration; it never utters a complaint or a groan. But when nature is vanquished by suffering; when privations have exhausted its strength; when life is ebbing, the dromedary kneels down, stretches out its neck, and closes its eyes. Its master then knows that all is over. He dismounts, and without an attempt to make it rise—for he knows the honesty of its nature, and never suspects it of deception or laziness—he removes the saddle, places it on the back of another dromedary and departs, abandoning the one that is no longer able to accompany him. When night approaches, the jackals and hyenas, attracted by the scent, come up and attack the poor animal till nothing is left but the skeleton. We are now on the high-way from Cairo to Mecca twice a-year the caravans go and return by this route; and these bones, so numerous and so constantly replenished, that the tempests of the Desert can never entirely disperse them; these bones which, without a guide, would lead you to the onses, the wells and fountains, where the Arab finds shade and water, and would end by conducting you to the Tomb of the Prophet; these bones are those of dromedaries which perish in the Desert. If you look attentively, you will see some bones smaller in size, and of a different conformation. These, too, are the wrecks of wearied bodies, that have found repose before they reached the goal. They are the bones of believers who desire

to obey the Prophet's command, that all the Faithful shall once in their lives perform this holy journey; and who, having been too long deterred from undertaking it by cares or pleasures, commence their pilgrimage so late on earth that they are obliged to finish it in heaven. Add to these some stupid Turk or bloated Eunuch, who, sleeping when he ought to have had his eyes open, has fallen and broken his neck; give the plague its share, which often decimates a caravan, and the simoom, which often destroys one, and you will readily see that these funereal guide-posts are planted with sufficient frequency to preserve the road in good order, and to point out to the children the route pursued by their fathers.

The party now reach the Sycamore, — the solitary tree—called emphatically "the tree of the Desert,"—the land-mark planted no one knows when or by whose hand, and marking the midway between Cairo and Suez. On their arrival at the Red Sea, it was high water, when it can only be passed in a boat. As our travellers were not pursued by Pharaoh, they naturally resolved to wait for a few hours, and cross after the manner of the Israelites. When the time arrived, forty minutes sufficed for the passage, and, in the deepest part, the water was scarcely a foot high. They next refreshed themselves under the palms which overshadow the fine "Fountains of Moses." At length they arrive at the mountains which surround Sinai, the native land of their guides. Of course there are welcomings and entertainments:—

When the repast was finished, it behoved us to repay hospitality with presents. We had brought with us kerchiefs of gay and varied colours, which we now distributed among the young Arabs. They were all quite naked, and each had a little bell suspended by a lock of camel's hair around its neck. Every night, before the tribe seeks repose, the dromedaries, the sheep, and the children are recalled to the enclosure: each flock is counted, according to its respective importance, in the order I have mentioned; and if any child is missing from the muster, the parents seek it, calling it and listening. If the child make no reply, the tinkling of the bell guides the searchers, and the strayed fugitive is thus found and brought back to the camp, which is never closed until it is well ascertained that not a single head is missing.

Dumas was delighted with the Monastery. He explores and sketches it with evident satisfaction—describes the old church, the Mosque which the government compelled the monks to erect in token of submission, the numberless chapels, the library, with its rare MSS., bound in wood, with silver arabesques, but, above all, the garden—

A miracle of patient and persevering industry. Its entire soil has been brought from the shores of the Nile on the backs of dromedaries, and spread on the granite-bed of this mountain; and the incredible quantity of mould thus transferred across the Desert may be imagined, perhaps, when the reader knows that the soil is of a depth sufficient for great trees to take root in it and flourish. A perfect system of irrigation is adopted, the water being brought from neighbouring or distant heights; thus enabling the soil to sustain the consuming ardour of the sun. By great care and daily and hourly attention, the most delicate plants are raised and preserved in this climate of fire, where the sky always seems like an over-arched plate of heated iron.—The finest trees and the best fruits that I have ever seen are the recompense of this inconceivable toil, which at the commencement must surely have expected more from faith than hope. The grapes, particularly, reminded me of the clusters of Eschol; a bunch that we broke from the vine where it grew weighed eighteen pounds.

The Album is next examined; it contained, we are told, the names of 1 American, 22 Frenchmen, and 3 or 4,000 English, including an adventurous "Miss Bennet," whose name was also found cut in the rock on the top of Sinai itself. The visit to Sinai contains little that is new or striking. The party now prepare to return.

Dumas, in the progress of his narrative, gives us some ingenious elucidations of the Mosaic history, suggested by localities. He remarks that the poetry of Moses' Triumphal Ode cannot be fully appreciated without reference to the circumstance of place as well as time. The little Oasis, still called by his name, with its five fountains and groves of palm trees, is described as a perfect isle of beauty, and must have added wonderfully to the effect of this sublime Ode when sung by Miriam and the maidens of Israel, to the accompaniment of their timbrels. The sea is indeed barely visible on the verge of the horizon, but still the scene of Pharaoh's overthrow was sufficiently near to justify the reference made to it as an object within sight. We have also some dissertations on Bonaparte's Egyptian Campaign, and an account of the Crusade of St. Louis, compiled from the chroniclers, and verified by examination of localities. But all these we must pass, as well as all particulars of the return journey; in truth, we are a little weary of the Desert, the dromedaries, and of M. Dumas himself.

While preparing this notice, we have received from Messrs. Wiley & Putnam, a translation of the work. It appears to be well enough executed, but the original was certainly not worth the labour which has been bestowed on it.

ANTHOLOGY FOR 1839.

We intended this week to introduce to our readers a few song-birds from over the Atlantic,—though, in truth, we had little to say in their favour:—there is nothing, indeed, characteristic in their music—not even, we regret to say, its excessive tameness. The names and poems of Halleck, Hillhouse, Percival, Bryant, Drake, Dana, Willis, Sigourney, and others, had already taught us that America has wood-notes both rich and sweet,—though differing but little from such as we have been accustomed to hear in our own poetic groves—being scarcely more than echoes of our national Anthology;—and, in like manner, amongst these lesser spirits, too many on both sides the water, seem to draw their inspiration from a common fountain, though one certainly not haunted by the Muses. We have, however, while turning over the numberless small volumes which have from time to time reached us from across the broad waters, stumbled on one, in favour of which we must make an exception, and shall therefore allow all our available space to "A citizen of the West," the author of a historical drama, in five acts, entitled '*Pocahontas*.'

'*Pocahontas*,' besides some other merits, has the great and obvious one which its name imports, of having sought its subject and materials amid the incidents of American story. It is, as its author remarks, illustrative of a marked epoch in the national annals, connected with the first successful effort to colonize Northern America. "It is connected, too, with the fates of a noble race, which is fast fading away from the earth," and the savage magnificence of whose character the author rightly conceives to be well adapted to dramatic effect. As we have before said, America must not hope to achieve anything original or great in poetry, till she learn to draw upon the magnificent features of her own natural scenery, and the stirring events and striking combinations of her native history, for her materials. With subjects so essentially dramatic, and accessories so sublime, there is a singular national unthriftiness in the neglect which has so long suffered her true poetic region to lie fallow. The present attempt would, therefore, be recommended to us by the ground it takes, if it had no other claim to our favourable notice. It may be questioned, no doubt, whether, amongst the crowded incidents of early colonial history, some might not have been found rising more nearly to the dignity of the drama, than the tale of 'Pocahontas;' or one at least which, being less hacknied by popular use, afforded the dramatic quality of a fresher interest. As an *acting* drama, there is no doubt, too, that it would have been improved by a greater concentration of the plot, and a stronger marking of the various characters, whose respective moral qualities are the true causes contributing to its action and denouement. Of this, however, the author is himself conscious. "Though, from want of experience, (he says,) I am a poor judge in such a case (in which, by the way, the most practised are often at fault), yet I am aware that my drama will be found lacking in two elements, important in a technical point of view. Its scenes embody little deep tragedy, and less broad humour. I feel it to be deficient in that bold, startling style of finish, which shows so much better than it reads;—a defect similar to that of a scene painter, who, neglecting to make allowance for distance and glaring light, should lay on his colours with an elaborate care, which would call forth our approbation in a landscape suspended on a parlour wall, but shows weak and ineffective when viewed from the boxes, and beneath the gas-light, of a theatre." Taking it, however, for what the author designed it to be—a narrative, in dramatic form, of the actual events in the order in which they occurred—a faithful episode out of early American history, unfettered by the conventionalities of dramatic construction,—it merits our good word, as breaking ground in the right direction, and working it not unskilfully. The principal hero is, of course, the Capt. Smith so familiar to the readers of early Virginian history,—whom, however, the author paints somewhat *en beau*; and the plot is made to turn on the jealousies and dissensions by which the councils of the first settlers were distracted, and themselves exposed to the hostilities of the natives. The incidents are, however, too popularly known for more particular notice here; but a specimen or two of the author's ability will prove the welcome which we give to an attempt of this kind. The following is illustrative of Indian manners,—and not unpoetical, though wanting in dramatic point and terseness.

Pocahontas. Thou bad'st me to thy lodge, and I am come.
Rolfe (Aside). Th' embodied spirit of her forest race!
Smith. Thou 'rt come!—I owe thee life, thou noble creature!
Life, that is dear, even to the crippled wretch;
To me now doubly dear, since it was purchased
At risk of thine. I owe thee life and freedom—
My being—all that gives that being value.
Thou 'st flung upon me such a load of debt,
That gratitude herself is crushed beneath it,
And lays her down, despairing!
Poc. This is strange!
I understand it not. In sooth I thought,
Had I been captive ta'en by Yengeese braves,
Thou wouldst have ventured more than that for me.
Smith. For thee!
Poc. Thou wouldst not?
Smith. Would not do't for thee?
Would not? That's bitter! Have I shown a spirit
So base, so craven, thou canst breathe a doubt,
And ask me if I would?
Poc. I knew thou wouldst.
See then! If thou hadst risked thy life for mine,
I would have borne thee love and filial duty,
And thought the debt redeemed. And would it not?
I did not know there *was* a debt, so great,
Love could not cancel it.
Smith. There's none! There's none!
Poc. Then see how quickly thou canst pay thy debt,
And never be the poorer. Wilt thou be
My father?
Smith. I!—Thy father?—I!
Poc. Ah me!
They told me white men were too cold and proud
To love!
Smith. Thy father, saidst thou?
Poc. Thou wilt not?
Smith. Dear Maiden!—
Poc. Ah! thou wilt! I see it in
Thine eyes. I am thy daughter Pocahontas.
Smith. All that the truest, fondest parent ever
Was to an only daughter, will I be
To thee!
Poc. Father! my heart is very glad.
Albeit the race to which I owe my birth
Is an unmixed one, I love the Yengeese.
I came among you as a stranger; now
The white men are my brethren.
Smith. Gentle maiden!
God grant the generous confidence thou giv'st,
Meet fair return from those whom thou hast trusted.
* * And hast thou ventured,
These forests through, alone?
Poc. Nay, not alone.
Two Indian maidens came with me; but they
Lost heart when they perceived the Yengeese lodges,
And tarried in yon copse. * * I must go
And fetch them.

The following paraphrase of an actual scene is worth quoting, as both curious, and having in it the spirit of poetry:—

Pocahontas. (*To Rolfe*). Now, brother, now, your promise.
Hast forgotten?
Rolfe. My promise?
Poc. Ay! the speaking leaf.
Nomony. Yes, yes,
The speaking leaf! I'm glad you thought of it.
[*They go to a table, on which lie writing materials.*

Smith. (*To Krabhuis*). Krabhuis, you're something a carpenter.
I promised Sachem Powhatan I'd send him
An English workman to fit up his lodge.
Say, will you go?
Krabhuis. I will.
Smith. Do what you can,
To plensure the old chief.
* * * And tell him that his daughters
Are safe and well.
Poc. And that to-morrow's sun
Shall light us to his lodge. [*Exit Krabhuis.*
Nomony. Oh, I'm so glad!
Rolfe. So glad! To-morrow? why so soon?
Poc. So soon!
We have been here—how long is it, Nomony?
Nom. The moon of flowers had just commenced, and now
'Tis one half gone.
Poc. Is't possible?
Rolfe. No, no;
It cannot be.
Poc. I think it cannot be.
Nom. Indeed it is. I have not lost a day.
Rolfe. Lost! I have gained, within that short half month,
More days of bliss than in long years before.
Not lost a day! So shrewd a reckoner?
I've found your secret, dear Nomony.
Nom. Have you?
Rolfe. Your body has been dwelling here among us;
Your heart——
Poc. (*To Nomony.*) Nay, sister, never look at me.
I've told him nothing.
Rolfe. Ah! I've guessed it.
Nom. How?
You've seen him?
Rolfe. Him! that little tell-tale word!
I've never seen him, no; but I can speak
To those I never saw.
Nom. Can you?
Rolfe. Look here! [*Writes.*
Take that to Captain Smith, and ask him what
It says.
Nom. What says it, Sachem Smith?
Smith. What's this?
Nom. Rolfe's speaking leaf. What says't?
Smith. (*Reads.*) "Nomony loves."
Nom. Nomony! Give it me! Nomony! I?
[*Turning it round, and examining it in all directions.*
It cannot be. Where are my legs, my arms,
My body? This like me! Look, Pocahontas!
Poc. 'Tis very strange.
Nom. (*To Rolfe.*) You told him what it was.
Rolfe. Indeed I did not.
Nomony. Let me see't again.
Nomony!—Ah! Rolfe, let me shut you out,
While Sachem Smith speaks to the leaf again;—
Then see if you can tell us what it says. [*Shuts him out.*
Speak to it, father Smith.
Smith. What shall it say?
Nom. Oh, anything. Say—Pocahontas loves not.
Smith. Loves not? [*Writes.*
Nomony. Ay, that will tease him. Make it say it.
Now, brother Rolfe, come in. What says the leaf?
[*Giving it.*
Rolfe. Ah, cruel leaf! Is't truth? She loves not?
[*Looking at Pocahontas.*
Nom. Who?
Rolfe. (*To Pocahontas.*) Thou lov'st not?
Nom. Let me see't.
Rolfe. (*To Pocahontas.*) Thou said'st so! Thou!
Nom. No, no; content thee; it was I who bid it
Say that. Rolfe, can a Red Man make it speak?
Rolfe. Any one can. You or your sister.
Nom. Can I?
I'd give my bow, of yellow orange wood—
The best in all our settlement—to know
That Medicine!

The following affords a good specimen of the author's own poetry, imaginative and descriptive:—

Rolfe. There's a heart
Beats under that dusk skin, might grace a court.
Smith. Ay might it. Yet right sorry should I be
To see the noble savage bend his knee,
A changeling in some royal antechamber;
Where worth and rank take birth from Princes' smiles,
And not from gallant deeds or fair desert.
Courtiers, methinks, are like to casting counters;
To-day of gold, to-morrow of base copper;
Varying in worth as the computant will;
Through one short game denoting tens of thousands,
The next, perchance, degraded down to units;
In nothing fixed, inherent, borrowed all.
[*Thunder. Looks out on the night. Tempest rising.*
Rolfe. A night of storm and splendour!
Smith. Now shalt thou see Dame Nature, in a garb,
Such as in other lands she scorns to wear,
And dons, here in her favorite haunts alone,
Where the majestic forest stretches, still,
Its giant arms in welcome; and where men,
Unweaned from her, have not yet learned to hate
The simple lessons their Great Mother teaches.
Rolfe. To me, in such a garb, she's doubly welcome.
Smith. Cast man adrift on such an ocean forest,
Leave him to sink or swim amidst its waves;
You've made him a philosopher—a sage—
Who learns to sift, of men and things the chaff
From out the wheat. Take me a dainty gallant—
What hundreds such I've seen!—a thing that lives
In plays, and feasts, and masques, and such love toys,
That picks one half a becafico's wing,
And doubts 'twill play the fiend with his digestion;
A thing made up of laces, cloth of gold,
Long hose, and curiously trussed points,
And tricksy riding shoes of costly cordwain;
Bepowdered and becurled, and bedwarfed
In mind and body; thrumming a bandore;
Or, to ape luckless Raleigh, puffing forth
A cloud of smoke from his new-fangled weed;
Or else, perchance, with cringing, courtly congee,
Prating of love—of love!—to butterflies.
Oh, how I loathe them!—Take me such an one,
And set him—ay, in such a night as this,
Amid these crashing forests—how his soul
Would shrivel up within his sapless carcase,
And shrink away, beneath the voice of nature
In her wild majesty! [*Loud thunder and lightning.*

And again the following—

Smith. Oh! they are wondrous wise, these merchant rulers;
Considerate—most considerate, i' faith!
Merciful—so that mercy fill their purses;
Just—an' if justice would but turn to gold.
With every virtue underneath the sun,
That will but yield the profit of a vice,
I'm sick of will-and-will-not gentry, I;
Men who would be at once both black and white;
Would pluck the fruits of Hell, on road to Heaven;
Would serve two masters, and take hire from both;
Men, who will scorn a brazen-conscienced cut-throat,
Then grumble that they've not a cut-throat's pay;
Expect the end, while they disclaim the means;
Covet the rich reward a villain earns,
And deprecate the villany that earns it;
Would buy damnation in the Devil's market,
Yet higgle at the price the Devil asks!
Radcliffe. I must not sit, and hear such terms applied
Unto our Council.
Smith. Now, I'd stake my life,
These men would read Las Casas' blood-stained page,
And start and weep over the tale of crime;
How thou, of summer isles the loveliest,
And most unfortunate, fair Hispaniola,
Saw'st thy poor children, peaceful erst and bless'd,
Torn from thy smiling vales,—to dig for gold!
Or, when they fled that torture, hunted down
By bloodhounds, in their native mountain-wilds!
How thy Caciques perished in treacherous flames;
How she—the noblest of thine island daughters—
Her nation's pride—Zaragua's hapless princess—
Anacaona, graceful, beautiful,
With but one fault, too generous kindness shown
Unto cold-blooded wretches—how she met,
Even at the hands of those her princely bounty
Loaded with benefits—a felon's death!
Yes, I'll be sworn they'll read these brutal horrors,
And lift their eyes to Heaven, and thank their God
They are not Spaniards. Yet they've small content—
Ay, that's the phrase—in that the Spanish coffers
Groan beneath countless ingots; and, the while,
Their own contain not, too, the price of blood.
They twit you with a catalogue of treasures
Obtained in Mexico by Fernand Cortes;
But speak of Guatimozin's bed of coals.
Ask if they sanction hellish deeds like that—
And straight their Hazael consciences take fire
And cry: "What! are we dogs to do these things?"
But yet they've small content!—Consistent souls!
They miss the million and a half of pesos
Ta'en by Pizarro as an Inca's ransom;
Why then, a' God's name, let them cast aside
These shackling, inconvenient, lady-scruples,
That, in the wearing, mar so grievously
Their rising fortunes' promise. Ay! and let them
E'en seek them out—they'll find them by the thousand—
Men who have Spaniards hearts and iron hands,
To do their dirty work;
Men who will bring home gold, and leave behind them
A desert, strewed with bones, and soaked with blood!

In the following scene, Pocahontas, who had saved the life of Captain Smith, at the risk of her own, and subsequently found her way through a night of tempest to warn the colony of treachery practised against them, and an intended expedition for their destruction, is, on her return to her father's settlement, taken prisoner, by an English faction opposed to that of Smith and his party,—and left for a time to believe herself the victim of the ingratitude of white men.

Pocahontas discovered, lying on a mat, manacled.
Poc. Chains! these are Yengeese chains! How cold they are!
They've chill'd my very heart! The sun! the sun!
The rich, bright, living sun! The happy wake,
Ay! even now, beneath his glorious rays,
Feel his warm influence gushing through their veins,
And kindling up within them joy, and love,
And gratitude!—Ha! gratitude! Kiehtan
Shut out that thought!—Cold, cold and dark!
[*Rising slowly, she approaches the window.*
Without
Still sings the free, wild bird. Without, without,
There's light and happiness! The mist's within me;
The darkness on my soul! [*Re-seats herself.*
Death! death, Great Spirit!
Let me have death—let me have death in tortures—
But suffer not that thus my spirit die,
Shut out from all that's good and beautiful
On earth. [*Distant sound of voices.*
'Tis his!
Rolfe. (*Without.*) Back, back, upon your life!
[*Clashing of swords.*
Poc. (*Starts up.*) The sun shines out! The cloud's from off my soul!
He comes!
[*The door is forced, and Rolfe, with one or two others, rushes in.*
Rolfe. In chains! in chains! Cursed villain!—There!
[*Looses them.*
My Pocahontas! speak to me! Thou'rt free!
Poc. I've found thee true and brave; that's more than freedom.
Rolfe. How thou must hate the Whiteskins!
Poc. I love thee!

In the last scene from which we shall quote, Smith has been wounded in effecting the rescue of Pocahontas; for whom he has nourished a hopeless passion, carefully concealed since his discovery that her love had been given to his friend Rolfe.

Smith. My daughter! Pocahontas!
Ay! let me see thee!—So!—Dost thou remember
That day thine Indian father bade prepare
The block for me?
Poc. Do I remember it?
Smith. Dost thou remember, too, who stepped between
Me and my coming fate—what bright, young form
Smiled through that moment's darkness—cast her life—
Her young—her happy life, with all its dreams,
Its promises, its hopes—dost thou remember
Who flung these fresh, rich treasures down, a ransom
For a poor stranger's life?
Poc. I am rewarded.
Smith. And who, through tempest-darkness—ay, through men,
With passions that out-storm the elements,
Came to a Yengeese tent, braving the anger
Of her own kindred—came, and brought us life;
Departed, and in guerdon of the boon,
Received, at White Men's hands, a dungeon's chains?
Poc. I pray thee, peace, my father. Life for life
I owe thee.
Smith. Rolfe, come hither. Look at her!
Weigh all we owe her in cold justice' scales;
Then tell me, if there be, within the reach
Of human power, a reward too rich
For kindness like to that.
Rolfe. None, none, dear Smith.
We may exhaust the stores of our invention
And rest poor bankrupts then.
Smith. Now, Rolfe, thou err'st.
There's a reward—there is but one on earth,
But there *is* one—that will out-recompense
Even deeds like these.—Didst ever sit thee down,
And think what hours, what days, what weeks, what years
Go to make up a life—to be told out
Lingeringly, one by one—this hour, the next,
The next again, and yet the following,
And still the day holds out—and then the week—
The month—the year—the LIFE!—Didst e'er bethink thee
What were the value of some Potent Spell,
Should shed around each moment, hour and day,
Each week and year—down to the closing scene—
The blessed breath of peaceful happiness;
A spell should breathe its influence benign
On our first waking sense, and yield its power
The last to sleep's unconsciousness: a sun
Should gild with roseate hue alike the scenes
That memory recalls or hope prepares;
And, at each moment, through a long—long life,
Should fall upon the conscious heart like balm,
And tell it, it is happy!
Rolfe. Smith, dear Smith,
Thy wound! Thou tremblest—art exhausted—come!
Thou'st need of rest—
Smith. Rolfe, hast thou read my riddle?
Hast thou, dear Pocahontas?—Ah, thou hast—
I see thou hast.—He loves thee! Thou lov'st him!
Your hands! God bless ye both!
Poc. My dear, dear father!
Oh, thou art ill!
Smith. I'm sure he loves thee—sure—
His is a noble nature, Pocahontas.
Thou wilt be happy. I shall hear of it—
Rolfe. Hear of it? See it.
Smith. (*To Pocahontas*). I shall hear of it;
And that shall be my happiness. The spell—
The mightiest upon earth—the spell of love—
Familiar, mutual, requited love—
Shall be upon thee; and its charmed power
Shall, at each moment, at a wish, call up
More wealth than ever crossed the desert sands;
Gems purer—costlier far, than Araby's;
Unsunned treasures, from that richest mine,
The human heart. And I shall hear of it!
Thine hours shall be of sunshine. With each day,
Afresh within thy heart shall gush the thought
That thou art loved, and lov'st. I'll hear of it
Beyond the broad Atlantic. That shall be
My happiness!

List of New Books.—Antipopopriestian, or an Attempt to Literate and Purify Christianity from Popery, by John Rogers, 12mo. cl. 7*s.* 6*d.*—The History and Antiquities of Newbury and its Environs, &c. 8vo. cl. 14*s.*—Freeman's Farmer's Account Book, 4to. bds. new edit. 5*s.*—The Scheme of Prophecy, from Daniel, 16mo. cl. 4*s.* 6*d.*—Todd's Student's Manual, from the last American edition, 12mo. cl. 3*s.*—Life and Times of Selina, Countess of Huntingdon, Vol. II. 8vo. cl. 13*s.* 6*d.*; complete in 2 vols. 8vo. cl. 24*s.*—Six Years' Residence in the Austrian Provinces, ending in 1839, by William Allen, Esq. 12mo. cl. 12*s.*—Ireland, Social, Political, and Religious, 2 vols. post 8vo. 21*s.*—Sir Humphry Davy's Works, Vol. II. "Early Miscellaneous Papers, &c." post 8vo. cl. 10*s.* 6*d.*—The Orchards, 12mo. cl. 10*s.* 6*d.*—Bethell on Regeneration, 3rd edit. 8vo. 7*s.* 6*d.*—Tupper's Modern Pyramid, royal 12mo. cl. 7*s.* 6*d.*—The Visionary, Canto III., by Lady E. Stuart Wortley, royal 12mo. cl. 7*s.*—The Evergreen, in Prose, by the Rev. B. H. Draper, royal 32mo. 3*s.* cl., 3*s.* 6*d.* silk.—Scripture Stories, 10th edit. 18mo. cl. 3*s.*—Bartley's Short Essays, in Verse, royal 12mo. cl. 3*s.*—Sandford and Merton, 18mo. cl. lettered, new edit. 2*s.* 6*d.*

NINTH MEETING OF THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

[*From our own Correspondents.*]

WEDNESDAY, AUGUST 28.

Section A.—MATHEMATICAL AND PHYSICAL SCIENCE.

Mr. Follett Osler gave an account of the Indications of his Anemometer.—An anemometer and rain-gauge, similar (said Mr. Osler) to the one that I constructed about three years ago, and which has, since that period, been at work at the Birmingham Philosophical Institution, was erected at Plymouth, a few months ago, by order of the British Association, and placed under the superintendence of Mr. Snow Harris. Having just received the registers of this instrument, I shall take a cursory review of a few of them, in conjunction with those obtained in Birmingham. I shall confine my remarks entirely to the direction of the wind as registered, and not attempt on the present occasion to connect any barometric or thermometric observations with these. As it would not be possible to illustrate more than a few of these observations, I have selected those only in which the wind has been tolerably steady and strong, as being the best mode of giving a correct idea of the nature and value of these observations:—On the 17th of November, 1838, a steady current set in at Plymouth about 8 o'clock, A.M. from the S. by E., and continued until 8 o'clock on the following evening, a period of thirty-six hours. The steadiness of this current at Plymouth was very remarkable: during the first part of this time there was almost a perfect calm in Birmingham; however, by 10 o'clock in the evening, that is to say, fourteen hours after this current from the S. by E. had set in at Plymouth, a slight wind was felt at Birmingham from the north; in three hours more, that is, by 1 A.M. on the 18th of November, it became E.N.E., and finally set in a strong gale from N.E. by N. which lasted the remainder of the day. It is a singular fact, that as this gale increased in force at Birmingham it declined at Plymouth; this was towards the middle of the day; in the evening the contrary to this took place. The rush of air from the S. by E. at Plymouth continuing for such a length of time previous to any wind being felt at Birmingham, clearly shows that this must have been the main current; and it seems highly probable that the atmosphere for some distance north and south of this current was gradually affected, and eventually drawn into it. The state of the wind on the next day (November 19th,) very much confirms this view of the subject: the current by that time became due E. at Plymouth, and N.E. at Birmingham. On the 20th there was but little wind at either place, and the directions then became the same in both places. During a considerable portion of this time much rain fell; about .76 of an inch in Birmingham, and 1.32 at Plymouth; the two principal falls in Plymouth preceding those in Birmingham by about four hours. On March 28 a strong wind set in from the west at Plymouth, which continued the whole day. At Birmingham the wind was S.S.W. when this gale commenced; but after continuing in that direction about twelve hours, it moved gradually round to the west, and finally to the W.N.W. During the time of this change, the strength of the wind at Plymouth increased considerably, though it did not alter in direction. A deflection in the wind, in the opposite direction to what is here illustrated, sometimes takes place, but not so frequently. Whether the deviations here exemplified are in *regular* curves, and are segments of large circles, or merely deflections in the course of the currents caused by some peculiarity in the situation of the places, or whether it be our insular position that modifies the currents, I cannot venture an opinion. The course of the currents are, as might have been expected, much more steady at Plymouth than at Birmingham. Thus on the 29th, 30th, and 31st of January last, the wind commenced at due west, and veered at a perfectly even rate round to the north; while in Birmingham the course of the current was exceedingly unsteady, and veered round one half the compass, while in Plymouth it only moved one quarter: this, among many other instances which I could bring forward, shows that great care should be taken in the selection of stations for making observations concerning the course of the great currents of the atmosphere, which ought to be our main object in the first instance; for we must not hope, for a long time to come, to lay down the minor fluctuations to which the greater ones are subject. I shall conclude with a few remarks on the great storm of the 6th and 7th of January last, that committed such dreadful ravages in this country, and trace its probable course and action. In addition to the records obtained by the Anemometer at this place and at Plymouth, I have collected what information I could concerning the nature and extent of this storm from many parts of the British Isles. A careful analysis of these, strongly leads me to the opinion that this was a small but violent rotatory storm, moving forward at the rate of about thirty to thirty-five miles per hour. The diameter of the rotating portion I am not prepared to give, nor do I consider it at all certain that it could be ascertained, as it seems likely that the revolutions were not in contact with the earth. The tendency of this eddy, or violent whirling of the air, would, of course, be to produce a vacuum in the centre. The air that forms the eddy being constantly thrown off in a slight degree spirally upwards, and dispersed on the upper portion of the atmosphere, the effect of this would therefore be, to produce a strong current upwards. Now, supposing this large eddy to be perfectly stationary, there would be a rapid rush of air towards it from all sides, which would be drawn up and thrown off through this rotating circle, and dispersed with amazing rapidity above: but as it is moving on with great velocity, the air that is in the advance of the storm is not sensibly affected until the whirl is close to it; while in the rear the motion of the air is greatly increased; first, by the tendency of the air to rush into the great vortex of the storm; and, secondly, by the motion onward of the vortex itself. This vortex or revolving column would increase in size upwards, so as somewhat to resemble a funnel; it would in fact be similar in its shape and action to an immense water-spout; whether it was vertical or not is entirely a matter of conjecture, but I should consider it probable that it would incline in the direction that the storm was moving; namely, to the N.E., and that it was an upper current that carried it in that direction. The greatest intensity of the storm in England was evidently across Lancashire and Yorkshire. I therefore conceive that the nucleus of the hurricane passed in a N.E. direction over these two counties. Towards the sides, however, a little current set in a S. and even slightly in a S.E. direction, on the S. side of the vortex, and in a N.W. and westerly direction on the N. side, as before stated; but the main rush is behind. Our Anemometer shows that we first felt a fresh S. wind with a slight bearing of E. in it, which very shortly became more westerly, increasing considerably in violence, and it then moved round to the S.W., and became quite a hurricane, and continued so, very violent at first, but decreasing in strength during the remainder of the day: at Plymouth it commenced as a S.W. and then very gradually moved round a little more westward. It was by careful examination of the records of these two instruments that I arrived at the view I ventured to take of this storm, and the evidence that I have collected from various parts of the country concerning it, strongly confirms me in the opinion I have taken of it. Many violent storms followed in the wake of this extraordinary hurricane, but I have not attempted to investigate these, as the main storm would have thrown the atmosphere into so disturbed a state, that it would be very likely to produce minor eddies, gusts, &c.

Professor Stevelly observed that so long ago as 1834, at the Edinburgh Meeting, he read a paper in which he attempted to explain and account for, on well-established physical principles, the four leading meteorological phenomena—cloud, rain, wind, and hail. He gave reasons for rejecting the vesicular hypothesis as to the constitution of cloud, chiefly because no causes were known to exist adequate to the production of vesicles, and capillary attraction would tend to prevent it; and adopting the view of solid sphericles, he showed that mere diminution of size would be sufficient to account for their suspension, as even globules of platina could be so reduced in size, and suspended in such a manner as to descend at any given velocity, however small: adding to this the fact that electrical atmospheres to the globules, by repelling the air on all sides from the spherule of water, would virtually enlarge the bulk, without adding to the weight of the drop, and thus aid the suspension. Next, as to the formation of cloud; when a portion of cloud was once formed in air, loaded with vapour in the elastic state, the instant effect was a diminution of tension, and a fall of temperature in that spot; air would then rush in on all sides, but air loaded with vapour, rushing into a void will form cloud; more cloud would, therefore, be formed, and the causes again put into operation for the formation of more, and this, as he called it, secondary formation of cloud, would go on with greater rapidity the more the air was loaded with vapour, and along whatever course the air so loaded by the growing of the cloud would progress; in the meantime, the air rushing in to fill up the comparative void, would establish, when the causes were strongly in operation, progressive whirls, such as those described by Mr. Redfield and Col. Reid, on the same principle that water while going on along a course, if let out by a hole in the bottom, forms a whirlpool. The general correctness of this view was shown by the fact that Mr. Redfield and Col. Reid's whirls were found to progress along the course of the gulf stream, the warmth of which tended to load the air above it with vapour; and in the hurricane which did such damage to Charleston, the town was saved from destruction by the most violent part of the storm following the bend of the river: the shipping was nearly destroyed. In this way the perplexing fact was also to be accounted for, of the storm being propagated against the course of the wind, as was well known also in summer thunder storms. These were the phenomena of dry storms. When much rain fell, the space above was left arid also by the descent of the water, while the air below was pushed out on all sides, thus very much modifying the current at the surface, increasing the force to leeward, and diminishing it to windward, causing sometimes the fearful and sultry calm preceding the thunder storm; the fall of temperature above, in consequence of the expansion of the air rushing in to fill the void, often froze the rain-drops as they passed through into hail, the surface of the boles of which would be clear ice, but, expanding as it formed the shell, the inner part would be opaque and crystalline, because partly void. Mr. Espy, of Philadelphia, had a theory nearly the reverse of this: he conceived the heat given out by the vapour in passing to the state of cloud or rain, to be so abundant, as, by its rarefying influence to cause a rapidly ascending column or vortex, capable of producing most appalling effects; and the only step doubtful in this theory was the first,—for, before the vapour can pass to the state of water, it must be robbed of this very latent heat by an external cause; but, grant this first step, and the rest of Mr. Espy's theory was almost a series of mathematical demonstrations.

A valuable paper was then read, 'On certain results which he had recently arrived at, respecting the minimum thickness of the crust of the globe, which might be consistent with the observed phenomena of Precession and Nutation, assuming the earth to have been originally fluid,' by Mr. W. Hopkins.—It will be sufficient, however, to refer the readers of the *Athenæum* to the abstracts which have from time to time appeared in this journal (Nos. 580, 587, 595), of the papers by Mr. Hopkins read at the Royal Society.

Mr. Smythies then communicated a general method of solving dynamical problems relating to the motion of free bodies, by means of differentiation and elimination of differentials without any integration, by which the result is obtained in a finite number of algebraical terms, when the equations of condition determining the motion are algebraically assigned.

'Report on Refractive Indices,' by Prof. Powell.—On presenting this report, which consisted of numerical results arranged in a tabular from, the author made a few preliminary observations on the nature of the inquiry, especially with reference to some points of dispute respecting the identification of certain rays of the spectrum, which had been discussed by Sir David Brewster and himself—(see *Athen.* Nos. 577, 578, 580). The report contained the mean results of many series of observations for a considerable range of substances.

Mr. Nasmyth exhibited 'A Plate-glass Pneumatic Speculum,' of his invention. The glass was three feet three inches in diameter, and three-sixteenths of an inch thick. It was placed on a concave cast-iron bed, and fastened in with bees-wax, which rendered

the apparatus air-tight. By drawing out the air from behind the mirror, which Mr. Nasmyth did with his mouth by means of a stop cock, the surface of the glass became instantly concave, and by withdrawing a little more or little less air the focus could be varied at pleasure: indeed, Mr. Nasmyth had no doubt that he could in this way bend the glass till it broke. —Prof. Forbes said, he should very much regret, on the score of disappointment and expense, if by any accident Mr. Nasmyth should chance to break the mirror; but he must own, that if such an accident did happen, he should like to examine the fracture, as he thought a fracturing force laid on with the regularity of atmospheric pressure, was not to be obtained by almost any other contrivance, and an examination of the fracture would probably throw some light on the molecular forces of aggregation and of elasticity. He thought also, that the unfolding of some new views interesting to his geological friends, might be the result.

'On a new Case of Interference of Light,' by Prof. Powell.—The author observed, that when a prism of one substance was opposed to another, slightly differing in dispersive power, (as plate glass and oil of sassafras), so as to produce a partial achromatism, *in the coloured edges*, which appeared on either side of the white image of a narrow line of light, when viewed through a small telescope, there were formed *dark bands;* about four or five being visible on each edge, parallel to the line of light. The explanation is easy, when we consider that of the parallel pencil of each primary ray which enters the eye, (in breadth equal to the aperture of the pupil), the rays which have traversed greater thicknesses of the first prism, traverse less thicknesses of the second; and thus have their retardations so nearly compensated, as to be in a condition to interfere and produce the dark bands observed.

'On Photometry, or a mode of measuring diffuse day-light comparatively, at any time and place,' by Dr. Andrew Ure.†—When lights of different intensities have the same quality of tint, or tone of colour, they may be measured relatively to each other, by the relative depths of shadow which they project upon a white wall or screen, from an opaque body interposed. The light of oil lamps and of candles, either wax or tallow, has the same yellowish tint, and may be most exactly measured by placing the several luminiferous foci at such distances from the screen, as that the shadows which they let fall from one and the same object, shall be all of equal depth. And since lights diminish in proportion to the squares of their distances, we have merely to square the respective distances of these luminiferous foci from the screen, to obtain an exact measure of their relative intensities. For example, when a wax candle of three to the pound, and a good mechanical or Carcel lamp, are placed respectively at distances of three and of ten feet from the screen, their flames will be found to project shadows from a slender cylinder, of equal depth. Now, the squares of these numbers being 9 and 100, will denote the relative illuminating powers of the candle and the lamp. When the tint of the light, however, is very different, as with the bluish flame of gas, the vivid white of an argand lamp fed with oxygen (called the *Bude* light), or the gray light of the sky, it becomes very difficult to measure the respective intensities of such lights, by comparing the shadows which they project, with the shadows projected from the flame of a standard or wax candle, or a mechanical lamp. I experienced this difficulty, (Dr. Ure observed,) of late upon two interesting occasions. The first was in trying to measure the relative illuminating powers of the Bude light, in subserviency to my examination before the Select Committee of the House of Commons, on lighting the House. The second was in estimating the degree of obscuration of daylight, produced by a high wooden wall or hoard, recently erected in a garden behind two valuable houses in George Street, Hanover Square, London. The landlords of these houses, justly conceiving that such a wall, if permanently built, (as was intended,) would greatly deteriorate the value of their property, were advised to sue for an injunction against it. As certain surveyors and architects had taken upon them to declare in their affidavits, that the obscuration produced by the said hoard was inconsiderable in itself, and did not materially impair the comfort of the tenants of the houses, I was called upon, by the solicitors for the plaintiffs, to investigate scientifically the darkening effects upon the windows and principal apartments of the said houses produced by the hoard, and to show that they were not matters of vague opinion, but were points susceptible of physical demonstration and accurate measurement. After several trials, I satisfied myself, that the method of comparing the shadows projected by the windows opposite the hoard, and those from the windows of an adjoining house, not opposite to it, with the shadow of a standard wax candle, was not capable of affording uniform results, even when the yellow light of the candle was modified by a plate of pale blue glass. I had recourse to another photometric plan, which appears to be free from all ambiguity or source of error. The chloride and several other salts of silver are so very sensitive to light, as to take a dark grey tint from exposure to diffuse daylight in a very short time. When the aspect of the sky continues uniform for two or three hours, paper imbued with the nitrate, carbonate, chloride, or phosphate of silver, will assume a depth of grey or brown tint proportional to the time of its free exposure to the day. Availing myself of this principle, I simultaneously placed pieces of paper so prepared, in the apartments subject to the darkening influence of the wall, and in apartments of the adjoining house, not under that influence. The papers which enjoyed the free aspect of the sky, having assumed a decided depth of hue in half an hour, I folded them up from the light, and proceeded to watch the papers placed opposite to the windows less or more obscured, till I observed them to take the same depth of tint. I found that in the dining-room of the house No. 16, in George Street, the paper exposed at the determinate distance from the windows, required three hours to acquire the same dark colour, and in the dining room of the house No. 17, it took an hour and a half. Hence it may be certainly concluded, that the day-light in the said apartment of No. 16 was diminished sixfold, and in that of No. 17, three-fold, by the interposition of the hoard. A piece of the paper laid upon the sideboard of the dining-room in No. 16, continued during the whole of a bright summer's day, without being perceptibly darkened in its hue; proving very manifestly that hardly any sky light at all was allowed to reach the bottom of this fine room, which is thirty-two feet long. The relative degrees of diurnal illumination in different apartments of any house—in different countries—or on different days in the same place or country, may thus be accurately measured and permanently registered by a series of photogenic impressions of any form, which will exhibit the progressive depths of tint, after an exposure during a certain number of minutes to diffuse daylight; care being always had to prevent the direct or reflected impulsion of the sunbeams. The tints thereby produced being fixed by water of ammonia, hyposulphite of soda, or any of the well-known photogenic expedients, will serve as standards of comparison to enable us to estimate the vivacity of daylight in any region of the globe, from the time in which paper similarly prepared with a standard salt of silver, acquires from exposure to day-light the same hue. And since the comparison of tints may be made with considerable precision by an experienced eye, this photometric method may prove a valuable addition to the scientific resources of the meteorologist.

'Experiments to determine the Fluency or Viscidity of different Liquids at the same Temperature, and of the same Liquids at different Temperatures,' by Dr. Ure.—Having been employed professionally, Dr. Ure observed, to investigate the operation and merits of a new lamp, recently patented by Mr. Parker, in which the oil is heated by the flame of the lamp to the temperature of from 200° to 250°, before arriving at the wick, it was desirable to determine the degree of fluency imparted to oils by a certain elevation of temperature. The light emitted by this lamp, when supplied with the viscid, and very cheap, but nearly scentless, southern whale oil, surpasses in purity and whiteness the light of the best mechanical lamp, though it be fed with the best vegetable or even sperm oil. This superiority is in part due to the form of the chimney, and to the oil being maintained uniformly at the level of the bottom of the flame; but it must also be ascribed, in a certain measure, to the high temperature and fluency of the oil, by which it enters more readily into complete combustion, than cold and viscid oil could possibly do. The preparatory heating seems to act on the same principle here, as it does in the smelting of iron by the hot blast. Having presented a memoir upon the subject of the lamp to the Society of Civil Engineers, which will appear in their Transactions, I shall decline entering at present further into its merits. In that memoir, I stated the results of some experiments which I had then made upon the fluency of liquids, by means of an apparatus, consisting of a small glass syphon, and a platina capsule, containing a measured quantity of the liquid to be run off through the syphon. Having since had reason to imagine that certain numerical errors had been occasioned by variations in the position of the syphon, though the general results are true, I have recently repeated the experiments with another form of apparatus free from that fallacy, and submit the following brief account of them. Upon this occasion I put the liquid, either cold or heated to a certain temperature, into a glass funnel, terminated at its beak with a glass tube of uniform bore, about one-eighth of an inch in diameter, and three inches long. The funnel was supported in a chemical stand, and discharged its contents, on withdrawing a wooden pin from the beak, into a glass goblet placed beneath, alongside of which a chronometer was placed to indicate, in seconds, the time of efflux. The volume of liquid used in each case was the same,—viz. 2,000 grain measures, at 65° Fahr. The times of efflux with liquids of the same specific gravity and bulk, in the same vessel, vary with the viscidity of the liquids, and serve to measure it. A correction ought to be introduced in estimating the times of efflux of hot liquids, on account of the enlargement, by expansion, of the bore of the glass tube; but this, being a point of little consequence in the practical application of this inquiry, has been neglected.

2,000 grain-measures of water, at 60° Fahr., ran off in	14 sec.
68	13
164	12

When the funnel and glass tube were faintly smeared with oil, though perfectly pervious, and apparently clean, boiling hot water having been run through them:—

2,000 gr.-measures of water, at 150° Fah., ran off in	24 sec.
142	23
94	24
56	25

So great is the repulsive influence between oil and water, in retarding the flow of the latter through a small orifice.

2,000 grain-measures of	Fahr.	Spec. grav.	Sec.
Oil of turpentine	65°	0.874	14
Pyroxylic spirit	,,	0.830	14½
Alcohol	,,	0.830	16
Nitric acid	,,	1.340	13½
Sulphuric acid	,,	1.840	21
Ditto	262	....	15
Saturated solution of sea salt	65	1.200	13
Sperm oil	,,	0.890	45½
Fine rape-seed oil	,,	0.920	100
Fine pale seal oil	,,	0.925	66
Fine South Sea whale oil	,,	0.920	66
Sperm oil	254	....	15
Rape-seed oil	254	....	17
South Sea oil	250	....	17

The rape-seed oil is so viscid, as to burn with difficulty in lamps of the ordinary construction, but in the hot oil lamp of Parker it affords a very vivid light. In my former apparatus, the difference of level between the two legs of the syphon, which constituted the effective pressure of efflux, was only half an inch, whereby 2,000 grain measures of sperm oil, at 64°, took no less than 2,700 seconds to run off, while that volume of oil of turpentine ran off in 95 seconds. It would, therefore, appear that the fluency of a viscid oil diminishes in a very rapid ratio with the diminution of pressure. Hence, an oil will burn well in a mechanical lamp, where it is raised to the level of the bottom of the flame by pump work, which will afford a very indifferent light in one of the French Annular or Sinumbral

† See also an account of Dr. Daubeny's apparatus described, Sect. A. Monday,—p. 643.

lamps, where the supply is given by a very slight pressure.

Prof. Forbes asked what was the diameter of the orifice of the funnel through which the fluids ran, and what was the quantity of each fluid experimented upon.—Dr. Ure said, that the orifice had a diameter of one-eighth of an inch, and the quantity of each fluid used was 2,000 grains.—Prof. Forbes said, that the interest he felt in these experiments arose from the great importance, in some of the researches he was engaged in, of sustaining the action of the lamp in an unchanged state during the progress of an experiment, and sometimes during a series of experiments; but the changes to which even the best ordinary lamp was subject were so anomalous, and the causes so beyond the reach of discovery, as to be quite disheartening. The instrument that he used for measuring minute changes of temperature was so delicate, that the heat given out by even an apparently well-burning lamp, often appeared to be in a constant state of change, the needle indicating it by an almost constant oscillating motion of even several degrees; even lamps, whose wicks were made with the greatest care, were subject to these changes; and the only wicks which he had found to furnish a sufficiently steady temperature for his purposes, were those made by Locatelli, of Paris.

'On the Explanation of some Optical Phenomena observed by Sir D. Brewster,' by Prof. Powell.

The experiments of Sir D. Brewster, here referred to, were those stated at the two last meetings of the British Association, in which, on looking at the spectrum, partly through, and partly over the edge of a plate of any transparent substance, it is seen marked by numerous dark bands. If a plate of mica or selenite be cut with an edge sloping off at an angle, compound bands are seen. In all cases, the plate must advance from the blue end of the spectrum; if the other way, no bands appear. Hence, Sir D. Brewster considers the effect as due to a new and peculiar sort of polarity in the light of the spectrum. It is allowed on all hands, that the *bands* simply might be accounted for by interference, but not the polarity. The author has repeated and varied these experiments, and conceives that *all* the facts are easily explicable by interference, if combined with the simplest considerations as to the manner in which the spectrum is received by the eye. The formation of the bands (in general) is accounted for by the interference of rays retarded by the intercepting plate, with those not so intercepted. This part of the inquiry was extended, by using substances of different refractive and dispersive powers, both as plates and prisms, as well as plates of various thickness. According to these differences in the retardation the bands were closer or wider. The conditions might be expressed by formulæ, and the requisite thickness and refractive index calculated. Two plates combined and overlapping, act by their difference of thickness. The smallest *breadth* of any plate (if of the requisite thickness) will act. Hence, the effect of the oblique edge is explained by a succession of edges, and was imitated artificially, by combining several plates slightly overlapping. Each plate gives its own set of bands, and thus compound systems of superposed bands are produced. Some plates are found with natural differences of thickness at some points, on simply looking through which, bands are seen. These phenomena, as well as those ascribed to polarity, appear perfectly explicable on the same principle as that referred to in another communication, (just laid before the Section,)—viz. that the two pencils which interfere, are the two halves of the parallel pencil of each ray, which converges in the eye, and whose breadth is equal to the aperture of the pupil; the intercepted half being that which has passed through the less thickness of the prism, and whose retardation is thus equalized with that of the other half; while the differences in retardation for different rays of the spectrum are successively odd and even multiples of a half wave-length. This is confirmed by fixing an opaque border, about the breadth of the pupil, on one half of the edge of the plate, while the other is left bare: bands are formed by the open part, but not by the covered.

Mr. W. J. Frodsham exhibited and described an improved compound Pendulum, manufactured by him, but no mere description could make the subject intelligible to our readers.

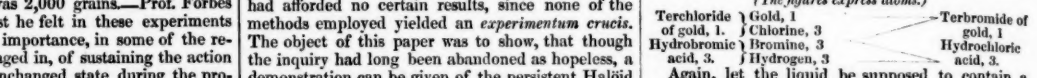
SECTION B.—CHEMISTRY AND MINERALOGY.

WEDNESDAY.

'Experimental Demonstration of the certain Existence of Haloïd Salts in Solution, by Dr. George Wilson.'—It was observed that all previous attempts to decide the question, whether Haloïd salts do or do not decompose water, when dissolved in it, had afforded no certain results, since none of the methods employed yielded an *experimentum crucis*. The object of this paper was to show, that though the inquiry had long been abandoned as hopeless, a demonstration can be given of the persistent Haloïd condition of the dissolved Haloïd salts of the electro-negative metals. The mode of experimenting followed was based on an important difference between the two great classes of metals—that whereas the electro-positive metals, as potassium, sodium, zinc, iron, &c. dissolve in the hydracids with the evolution of hydrogen, indicating thereby (according to the more simple theory of the change) an attraction for the radicals of the acids superior to that of the hydrogen which they displace, the electro-negative metals, on the other hand, do not dissolve in the hydracids, nor decompose them; they cannot, therefore, displace hydrogen, but should be displaced by it; as the halogens or salt radicals have thus a less attraction for the electro-negative metals than hydrogen has, this body may be employed to decompose their Haloïd salts. The action of uncombined hydrogen on the dissolved salts was shown to be not of itself decisive as to their true state in solution, but its effect on them when evolved from an hydracid affords an unequivocal *experimentum crucis*. Gold and its terchloride were chosen as examples of an electro-negative metal and its Haloïd salt; and hydrobromic acid was taken as the decomposing re-agent. In anticipating their action on each other, it appeared that if the chloride of gold became by solution in water an hydrochlorate of the oxide, it should not be decomposed by hydrobromic acid, which has a less attraction for all metallic oxides than hydrochloric acid has. But if it be persistent as a chloride, it should be decomposed by hydrobromic acid, since the chlorine and hydrogen are combined with two bodies, gold and bromine, for which they have a less attraction than they have for each other; they should therefore combine to form hydrochloric acid, while the relinquished gold and bromine also unite that a bromide of gold may be formed. When this experiment is performed, the chloride *is* decomposed by hydrobromic acid, the bodies added being the dissolved terchloride of gold, and hydrobromic acid; the products of the change are, the similarly disolved terbromide of gold and hydrochloric acid; and the immediate proof of such a change having occurred, is the alteration of colour which succeeds the mingling of the two bodies. The solution of the chloride of gold has a pale yellow tint; the bromide has a dark red hue; any conversion, therefore, of the chloride into the bromide is indicated by the colour of the liquid passing from pale yellow to dark red. To determine the certainty of this decomposition, the liquid was separated, either by distillation or by agitation with sulphuric ether, into the bromide of gold and hydrochloric acid, which were respectively tested and ascertained to be such. The certainty of the decomposition having been determined, and its occurrence in atomic as well as in irregular proportions learned by repeated experiment, the theory of the change may now be considered. It is conceived by some a sufficient explanation, to declare the chloride to have become an hydrochlorate by solution in water, and to refer the decomposing action of hydrobromic acid to a superior attraction for oxide of gold, which enables it to displace hydrochloric acid. A reversal of the usual order of affinity is thus supposed to exist for each of the hydracids in relation to the oxides of the electro-negative metals, so that hydriodic acid is the most powerful and hydrochloric the weakest. But the author shows the impossibility of this anomaly occurring, since the compound of hydriodic acid and the oxide of gold (iodide of gold) is much less stable, a more easily decomposed body than the similar compounds of hydrochloric and hydrobromic acids. There are two other modes of explaining the decomposition, which, as they stand in marked opposition to each other, and afford by the conclusions deduced from them the demonstration desired, are stated, for the sake of contrast, in the form of diagrams, and as occurring in atomic proportions.

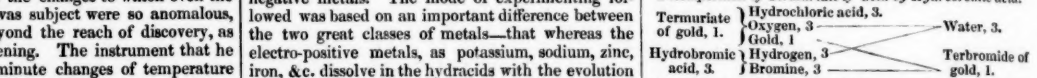
The salt of gold, being a terchloride, will require three proportions of hydrobromic acid for its complete decomposition. On the supposition of its dissolving as a Haloïd, its decomposition will occur thus:

Decomposition of Terchloride of Gold by Hydrobromic acid. (The figures express atoms.)



Again, let the liquid be supposed to contain a muriate of gold, it will be thus:—

Decomposition of Termuriate of Gold by Hydrobromic acid.



According to the former of these views, the hydrogen of the hydrobromic acid takes chlorine from chloride of gold, so that hydrochloric acid is *formed*; according to the latter, hydrogen takes oxygen from the oxide of gold, and water is formed; while hydrochloric acid, previously in combination, is set free. The author shows that the latter, or Amphide theory, which conceives the chloride to decompose water, cannot be argued without adopting the terms of the opposite or Haloïd theory; but, without insisting on the strong testimony to the truth of the latter mode of explanation afforded by this unwilling employment of its language, by the advocates of the former, he goes on to an unequivocal result of both explanations, which affords the demonstration we are in quest of. By a reference to the diagrams it will be seen, that, in each of the only two possible methods of explanation, we end by admitting the production and presence of a true Haloïd salt, the terbromide of gold. It cannot be declared possible that the bromide of gold, as soon as formed, has decomposed water, and become an hydrobromate, since, by reference to the lower diagram, it will be seen that the production of the bromide, according to the Amphide theory, implied the re-solution of hydrobromic acid and oxide of gold into water and bromide of gold. The production of water was declared essential to the change; its decomposition cannot therefore be assumed as equally possible, since the previous half of the explanation would thus be negatived, and the theorist should only exclude the bromide from the list of Haloïd bodies, by admitting the chloride, or *vice versâ*. The nature and value of this mode of experimenting is summed up in the following proposition: the disolved terchloride of gold is decomposed by hydrobromic acid, with the production of terbromide of gold, in circumstances which make it certain that one of these salts is a haloïd in solution: but, if one of these be a haloïd, the other is also, and so are all the salts of the same class. The demonstration is further shown to be afforded in another way: it will be seen, by reference to both diagrams, that each view recognizes the presence of bromide of gold and hydrochloric acid. But if the bromide became an hydrobromate, it would at once be decomposed by the hydrochloric acid; it is permanent, however, and must therefore be a bromide while in solution. A similar inquiry was stated to have been followed out with the haloïd salts of platinum, and with equally decisive results: and the author observed that the method proposed would afford an equally unequivocal demonstration for the haloïd salts of all the metals which have a less attraction for hydrogen than the radicals of the hydracids have, *i. e.* it would apply to all the electro-negative metals. It was further observed, as an incidental conclusion from the experiments recorded, that they afforded a direct proof of the quasi-metallic character of hydrogen, so much insisted on by the advocates of the binary theory of salts; and that they supplied more direct evidence than any previous trials regarding this, since they not only demonstrate hydrogen to have the power of displacing many metals, but at the same time assign to it, as its proper place in its metallic character, a position intermediate between the electro-positive and electro-negative metals.

Prof. Graham observed, that the author had satisfactorily demonstrated the point in view.

'On the Crystallization of Carburets,' by S. Brown, M.D.—The object was to lay down a new form of the maxim of crystallization—viz. That when the particles of a solid body are slowly evolved from

the decomposition of a substance of which it, or its elements, are chemical constituents, they cohere in crystal, and that independently both of the fusion (or solution) of the body crystallized, and of the presence of any fluid medium of molecular motion whatsoever. This principle the author deduces from a multitude of experiments. The principle is applicable to substances which are infusible and insoluble; and, indeed, as the title of the paper imports, has been inferred from observations made on such substances—viz. the metallic carburets, as produced by the decomposition of sulphocyanides and cyanides. The subjects of the experiments were the carburets of iron, copper, zinc, lead, tin, manganese, &c. These carburets are, in their amorphous form, dark and opaque, being not easily distinguishable from charcoal. By the use of the following formula, the author prepares these substances in transparent, colourless, and intensely hard little crystals. Formula:—Let a parcel of any cyanide or sulphocyanide be decomposed by heat, in exclusion from air, at that point of temperature which may be called its point of decomposition, and the resulting carburet is found to be of crystalline structure. It is a tedious process, requiring five hours for a drachm of cyanide of zinc. The author exhibited specimens of crystals procured in this way, especially of carburets of iron, which cut glass. The application of these facts and their principle to the explanation of certain mineralogical and geological cases of crystallization, as well as to the arts, the author left with the Section; but called attention to that point of view in which his labours are chiefly valuable,—that they prove that the only essential condition of the crystallization of a body is, that its particles be slowly segregated from any previous condition whatever. In conclusion, he observed that the chemical identity of carbon and the diamond has been long established by inference. Now, there is as great a difference,—nay, exactly the same difference, between the sensible properties of these carburets in their amorphous and crystalline conditions, as between the carbon of the destructive distillation of organic proximates and the *diamond*. The particles of carbon *may* be evolved from a matrix of which it is a chemical constituent; let them, in the terms of the general proposition, be evolved *slowly enough*, and they shall co-arrange themselves in the crystalline form of cohesion. In more pointed phrase, char wood with sufficient care, and you will obtain, not charcoal, but crystallized carbon.

'On the Limits within which the Equivalent Weights of Elementary Bodies have been ascertained,' by Dr. Clark.

Dr. Clark stated, that the time allowed would only permit him to advert to the equivalents of oxygen, sulphur, azote, and carbon, as determined by the best experiments, in relation to lead. The oxide of lead, as analyzed by Berzelius, gave for 100 of oxygen:—

Greatest	1295.70
Mean	1294.24
Least	1293.08

But inasmuch as, weight for weight, the oxide of lead is more bulky than the metal itself, a correction for the buoyancy of the air has to be made. This would make the oxygen 100.033. By reducing this to 100, and the lead in the same proportions, we obtain for the equivalent of lead:—

Greatest	1295.27
Mean	1293.82
Least	1292.65

The correction for air on the lead is thus −.43. Notwithstanding the difference between the greatest and the least equivalent of lead being 2.62, or one 500th part of the whole, the actual difference in the lead weighed was only one in 7,500, or 1-75th for 100,—a limit of experimental accuracy not easily exceeded. Partly, because this small difference is increased by whatever the oxygen loses the lead gains, and partly on account of the equivalent of lead being about 13 times that of oxygen, this error comes in the metal to be multiplied by 15. From a comparison of the experiments of Berzelius and of Turner on the formation of sulphate of lead from a given weight of lead, and of Turner's experiments on the sulphate of lead produced by a given weight of the nitrate, the following appeared to be the increase of 100. of lead—

	Greatest.	Mean.	Least.
In becoming sulphate..	46.431	46.401	46.374
„ nitrate ..	60.067	60.027	59.967

Hence, respectively, the following results:—

Lead	1292.65	1293.81	1295.27
Si+4O Least	599.45	599.99	600.67
Mean	599.80	600.34	601.02
Greatest	600.19	600.73	601.41
A^2+6O Least	775.42	776.12	776.99
Mean	775.92	776.64	777.51
Greatest	776.46	777.15	778.03

Subtracting 400.(=4 O) from the equivalent increase on the lead in becoming sulphate, and 600.(=6 O) from the equivalent increase in becoming nitrate, we obtain the equivalents respectively of sulphur and azote:—

	Least.	Mean.	Greatest.
Lead	1292.65	1293.81	1295.27
Sulphur	199.45	200.34	201.61
Azote	175.42	176.64	178.03

The differences and the sources of them may be represented as follows:—

	In sulphur.		In azote.	
On account of the oxide ..	−.54	+.68	−.70	+.87
„ sulphate	−.35	+.39	−.39	+.42
„ nitrate ..		....	−.13	+.10
	−.89	+1.07	−1.22	+1.39

Dr. Clark called attention to the very great amount of difference due to the oxide. This difference, he suggested, might warrantably be diminished on the consideration that, admitting the atmosphere to contain 21 measures of oxygen to 79 measures of azote, the equivalent of azote could not be so high as the results computed from the highest equivalent of lead afforded. For instance, 176.99 for the equivalent of azote, (the lowest result to be obtained on assuming the equivalent of lead 1295.27), would imply a specific gravity for oxygen less than 1.100; which would be inconsistent with all received experiments. On a similar consideration, the next highest result for the equivalent of lead might be rejected; and, from the average of the remaining four out of Berzelius's six experiments, and by computing the equivalents of sulphur and of azote as before, we obtain the following equivalents:—

	Least.	Mean.	Greatest.
Lead	1292.65	1293.27	1293.89
Sulphur	199.45	200.09	200.77
Azote	175.42	176.31	177.20

The differences, and the sources of them, are shown as follows:—

	In sulphur.		In azote.	
On account of the oxide ..	−.29	+.29	−.39	+.42
„ sulphate	−.35	+.39	−.37	+.37
„ nitrate ..		....	−.13	+.10
Diminished differences	−.64	+.68	−.89	+.89
Former additional variation on account of oxide.....	−.25	+.39	−.33	+.50
Former differences	−.89	+1.07 ..	−1.22	+1.39

From Berzelius's experiments on the tartrate and racemate of lead, and taking an equivalent of hydrogen as 12.6, which Dr. Clark stated was the correct result inferrible from Berzelius's own experiments on hydrogen, the following was inferred, by a similar train of reasoning, to be the equivalent of carbon:—

Least	75.28
Mean	75.60
Greatest	75.92

The differences, and their origin, are as follows:—

On account of oxide	±.09
„ salt	±.23
Total difference	±.32

From the benzoate of silver, containing 14 equivalents of carbon, it appeared that one equivalent of carbon was 75.63; so that 75.6 is probably very nearly the true representative of this important equivalent.

Mr. Richard Phillips read a short paper, 'On the Synthetical Composition of White Prussiate of Potash.'

'On the existence of Fluoric Acid as a constituent of certain Animal Substances,' by G. O. Rees, M.D.—The author stated, that he had endeavoured to obtain proofs of the existence of fluoride of calcium while analyzing human bone; but in no instance could he detect the action of fluoric acid upon glass. Having failed to detect it in bone, he next applied himself to ascertain if fluoric acid existed in the enamel of teeth, in recent ivory, and in the precipitate obtained from urine by means of lime water, but in neither case did he succeed in detecting traces of fluoric acid. The author however states, that he had detected it in fossil teeth.

'On the Proofs of the existence of free Muriatic Acid in the Stomach during Digestion,' by Dr. R. D. Thomson.—The object of this communication was, to offer some experiments which would appear to call in question the principle upon which those were founded, from which Dr. Prout, and Messrs. Tiedeman and Gmelin came to the conclusion, that free muriatic acid exists in the stomach of animals during digestion. The method of determining this point was published by Dr. Prout, in the Transactions of the Royal Society in 1824. The methods by which that distinguished physician arrived at the conclusion, that free muriatic acid was contained in the stomachs of dogs during digestion, were as follows:—he first evaporated a quantity of fluid taken from the stomach in its natural state, and ignited the residue. His object in this experiment was to drive off all the free acid, and to retain only that which was fixed or in union with a base. He then dissolved the residue in distilled water, and precipitated the solution by nitrate of silver; the resulting precipitate of chloride of silver indicated the amount of combined muriatic acid in the stomach. He then took another portion of fluid, saturated it with potash, evaporated it to dryness, and ignited it: the residue, being dissolved in pure water, was precipitated with nitrate of silver. The difference between the quantity of chlorine obtained by this experiment and the preceding, indicated the quantity of free muriatic acid. The conclusions drawn from these experiments are quite accurate, if one essential point is conceded, viz. that common salt undergoes no change by being heated to incandescence, in contact with organic matter. Dr. Thomson was first led to doubt the statement that free muriatic acid exists in the stomach, from the circumstance of finding muriatic acid not so efficacious as sulphuric in the treatment of alkaline indigestion, (a form of dyspepsia discovered by him some years ago, and described in a paper read at Bristol—(*Athen.* No. 463). He was then induced to examine the nature of the experiments of Dr. Prout, and has arrived at results which seem to render them questionable, if not to disprove the grounds upon which Dr. Prout arrived at the conclusion, that free muriatic acid exists in the stomach of animals. It is well known, that common salt, when very strongly heated, is capable of subliming: indeed, from the author's experiments, the volatilization would appear to commence at a lower temperature than is generally imagined. But it is not sublimed when it is mixed with certain substances. When common salt is heated to redness, and a current of steam is passed over it, partial decomposition ensues, the hydrogen of the water unites with the chlorine, and flies off in the form of muriatic acid gas; the oxygen combines with the sodium and forms soda. When anhydrous sulphuric acid is heated in contact with chloride of sodium, some decomposition takes place by the formation of sulphurous acid—these facts had been known for some time, but the author stated, that he was not aware that the subsequent facts were known. Having obtained a quantity of fluid from the stomach, he evaporated it, and, according to the process of Prout, ignited the residue. On dissolving the residue in water, and evaporating spontaneously, fine crystals of carbonate of soda were obtained along with numerous crystals of common salt. These could proceed only from one of two sources, viz. the decomposition of lactate of soda, should any have existed in the fluid, or from the decomposition of common salt. The author was inclined to attribute it to the latter source rather than to the former, in consequence of the very considerable number of crystals. He had further found in pursuing his experiments, and in accordance with this result, that certain organic substances possessed the property of decomposing common salt; when tartaric acid and common salt are heated together, copious fumes of muriatic acid are given out. The same phenomenon occurs with citric and oxalic acids—sago also would appear to produce some decomposition, and also saliva; but the experiment required so much delicacy that Dr. Thomson could not affirm the fact with certainty. The presence, however, of certain organic acids in the fluids of the stomach, would by the process of Prout render the conclusions to which he had come nugatory. The author, however, stated, that he had brought forward these experiments in their unfinished state, rather for the

purpose of showing the necessity for the further investigation of this subject, than with the object of denying the accuracy of former researches.

'On the theory of the formation of White Lead,' by Mr. Benson.—The carbonate of lead formed by the common process, is anhydrous, amorphous, and contains one proportional each of carbonic acid, oxygen, and lead. In order to explain my views (said the writer), I shall have to advert, for a moment, to the oxide of lead, termed litharge. Litharge is seldom manufactured with a view to its ulterior application, as it is produced as a secondary product in the separation of silver from lead, even under Mr. Pattison's arrangements, in quantities too large for the demands of commerce. A considerable proportion of the litharge made must, therefore, necessarily be reduced again into the metallic state, and, during this reduction, 7 per cent. of the weight of the metallic lead is lost by sublimation, and by combining with the earthy matter of the coal. Now, as litharge is a protoxide of lead, it has been thought, that in order to effect its conversion into white lead, nothing more was requisite than to combine it with a due proportion of carbonic acid; and from this mistake, a variety of fallacious processes have been projected. The processes to which I allude, are founded upon bringing the litharge into solution as a basic salt, and then precipitating it as a carbonate by the injection of carbonic acid. Painters maintained, that this precipitate was not white lead. Chemists, finding, by analysis, the correct proportions of protoxide of lead and carbonic acid, attributed the opinion of painters to prejudice. Dr. Ure was, I believe, the first to discover in what the difference between the precipitated carbonate and white lead consisted. I have already stated, that white lead produced by the usual mode of manufacture is amorphous, and, in oil, opaque; whilst, by microscopic observations, Dr. Ure has ascertained, that the former is semi-crystalline, and, to a certain degree, transparent. The difference between white lead and precipitated carbonate may be illustrated by comparing them to pulverized chalk and powdered marble; both are carbonates, but the one is crystalline, the other is not, and one is, consequently, less opaque than the other; and this difference is, of course, more appreciable, when the powders are diffused through highly-refracting media, such as oil. There is one mode by which this difficulty may be avoided, and this was arrived at previously to the discovery of Dr. Ure, as a deduction from a different train of reasoning. The rationale of both the processes, of that which produces the crystalline, and of that which produces the amorphous carbonate, is the same. In both, the lead is converted into basic acetate—in both, the salt is decomposed by carbonic acid, but in the former the process is modified by the pressure of water. In the one, the carbonate has been deposited from a solution—in the other, the particles, never having departed from the solid state, have not been at liberty to arrange themselves symmetrically. In order, therefore, to produce amorphous carbonate, or white lead, from litharge, it became necessary to present the oxide of lead with a quantity of acetic acid so minute, that an insoluble basic salt should be formed, with a quantity of moisture merely sufficient to determine the action of the carbonic acid. The process would then resemble, in all respects, the ordinary one, except that in the one the lead has been previously converted into oxide, in the other, the formation of the oxide goes on simultaneously with that of the carbonate. The process has been carried out on a scale of considerable magnitude at Birmingham Heath. The quantity of acetic acid used is less than 1-300th of the weight of the litharge, and the quantity of moisture found to be most advantageous is such as will just render the litharge sensibly damp to the touch. A purer and more economical source of carbonic acid than bark has been found in the combustion of coke, and powerful machinery has been applied to facilitating the process, by exposing new surfaces to the action of the gas. The result has been, that the process is completed in as many days as the ordinary one requires months, and the product is of a purer white, and in opacity or body, and all other respects, at least equal to the usual white lead of commerce. One or two other facts deserve mention, which are not generally known. It is singular, hat if the protoxide of lead known as massicot, and the protoxide known as litharge, be exposed to a high temperature, approaching to a red heat, the massicot will rapidly absorb oxygen, and become the ordinary red lead of commerce; while the same process goes on exceedingly slowly with the litharge, if at all; but, on the other hand, if massicot and litharge be moistened with dilute acetic acid, and exposed to carbonic acid, the litharge will be converted into carbonate before the massicot is much affected. Another fact is, that white lead and oil combine with so much energy, that if linseed oil be poured upon a large quantity of white lead, and the mass be left undisturbed for a few hours, the temperature will become so elevated, as to carbonize the oil, and render the whole perfectly black. It seems also not generally known, that white lead possesses the power of destroying the colouring matter of linseed oil. If sulphate of barytes be mixed with one portion of oil, and white lead with another portion, the latter will appear comparatively white. If the two mixtures be allowed to remain for some days undisturbed, a quantity of oil will gradually rise to the surface of both. In the former, the supernatant oil will have undergone no change—in the latter, the oil will be nearly deprived of colour, and will have acquired the degree of rancidity, termed by painters, fat. The colouring matter has not combined, as might have been expected, with the white lead, for if this be dissolved by the agency of a weak acid, the disengaged oil will also be found to have been bleached. A large quantity of white lead is required to produce this effect, and the precipitated carbonate is less efficient than the white lead of commerce.

Section C.—Geology and Geography.

Wednesday.

Dr. Buckland introduced to the Meeting Professor Schönbein, of Basle, who apologized for the absence of M. Agassiz. M. Agassiz has just commenced the publication of a supplement to his *Poissons Fossiles*, which he has dedicated to the British Association, as a token of regard and gratitude for the assistance that body has afforded him. In a letter to Dr. Buckland he mentioned that the skeleton of a bird had been found in the slate of Glarus, a formation about the age of the English gault. Similar remains have been stated by Dr. Mantell to occur in the Weald of Sussex.

Dr. Buckland then brought under consideration the importance of economizing our stores of fossil fuel, and, as at Newcastle, (*Athen.* No. 567,) explained the nature of Oram's Patent Fuel, which consists of dried river mud, 100 or 200 lb., 20 to 40 gallons of water, 40 lb. of coal tar, and 30 lb. of powdered lime, mixed with one ton of coal dust.

Mr. Lyell then announced the discovery, in a crag pit at Newbourn, in Suffolk, of the teeth of several species of mammalia. The first of these fossils was pointed out to him by Mr. W. Colchester, of Ipswich, and was afterwards determined by Mr. Owen to be the posterior grinder of the lower jaw of the leopard. Mr. Wood, on receiving this intelligence, examined carefully a large collection of teeth from Newbourn belonging to the Rev. Edward Moor, and they were found to belong chiefly to fishes of the genus Lamna: but among them was one which Mr. Owen has pronounced to be the molar tooth of a bear, and others which belong to a small ruminant. These fossils are all of them more or less broken, and there is no doubt they were found in the large pit at Newbourn, in which the teeth of fishes are abundant in red crag. But Mr. Lyell remarked that there are many vertical fissures extending downwards to the depth of 30 feet and more through the red crag at Newbourn, these fissures being filled with the detritus of shelly red crag. It is possible, therefore, that the mammalian teeth may have been derived from the contents of these fissures, and may therefore belong to a qualified epoch, posterior to that of the red crag. Mr. Lyell, however, inclines to the opinion that the teeth of the mammalia and fish will prove of the same age, because, although the shells of the red crag are almost exclusively marine, yet Mr. Wood has discovered at places distant only a few miles from Newbourn, a freshwater Amiator, the *Planorbis marginatus*, and two individuals of a land shell, *Auricula migosotis*, imbedded in the marine crag. The same river, therefore, that conveyed these shells to the sea may also have carried down the remains of land quadrupeds. Mr. Lyell then mentioned the discovery of the teeth of an opossum in the London clay at Kyson, near Woodbridge. This fossil, also from the collection of Mr. Colchester, was obtained, together with the teeth of fish, from the upper part of a bed of sand about ten feet thick, which is covered by a mass of London clay about seventeen feet thick. The clay is again covered, at a short distance from Kyson, by the red crag. Mr. Owen, on seeing this tooth, was clear that it could not belong to any of the decidedly carnivorous or herbivorous animals, but rather to some one of the mixed feeders, and having compared it with the teeth of the various tribes of quadrupeds included in that division, from the shrews to the monkeys, he found it to differ essentially from all of them; and he finally decided that it was marsupial, and one of the molars of a Didelphis allied to the Virginian opossum. Mr. Lyell immediately requested Mr. Wood and Mr. Colchester to renew their search in the same sand at Kyson, and they soon after found there a jaw and tooth, which Mr. Owen refers to a quadrumanous animal of the genus Macacus. The sand containing these remains is referable to the London clay, and this is the first instance of the fossil remains of quadrumana having been found in a deposit of the Eocene period. Cuvier had previously described a Didelphis from the Eocene freshwater gypsum of the Paris basin. Mr. Lyell, in conclusion, dwelt on the bearing of these discoveries, and on the doctrine of the progressive developement of mammalia at successive tertiary periods. The occurrence, he said, of an Eocene Macacus proved that the class most nearly approaching to Man in its organization was not limited, as some had supposed, to an era immediately antecedent to the creation of the human race. He also adverted to the great caution to be observed when we reason from negative evidence in Geology, as we do where we infer the non-existence of certain classes of beings, at remote periods, from the mere fact of their fossil remains not having yet been found in ancient strata. This caution is particularly requisite when we are examining purely marine formations, as the Red Crag and London Clay.

Dr. Buckland remarked that the condition of the mammalian teeth did not correspond with that of the fishes' teeth, with which they had been found, but this might be accounted for by their having been buried in a sand-bed. He alluded to the well-known discovery of bones of marsupial animals in Stonesfield slate, and stated, that remains of extinct species of gum trees had been found in oolitic strata, no doubt the habitations of ancient opossums. Not only do we find the remains of Pterodactyles at Solenhofen and the Isle of Portland, but in the former, remains of insects (Libellulæ) have been discovered, which must have floated off the land in the then existing sea, and have become, with other stray inhabitants of the land, entombed in marine strata. Perhaps discharges of carbonic acid may have suddenly destroyed a number of marine animals in a particular locality, with these land animals among them.

Mr. Bowman exhibited a number of specimens of fossil fishes from Manchester, and submitted a communication upon them from Mr. Binney. Scales and teeth of the sauroid fish, Megalichthys, are found in the low coal shales above the millstone grit in the Manchester coal field, and as far up as the fresh-water lime-stones of Ardwick. Remains of Diplodus, Ctenoptychus, Holoptychus, and Palæoniscus, are found in greater abundance, though not so extensively disseminated. The specimens exhibited were from the three quarters mine of St. George's road, and the four foot mine of Pendleton. Some are found in a rock composed of the shells of a Cypris and a species of Microconchus, indicating a tranquil deposit of the bed as in a lagoon of a tropical climate. Some specimens are found quite close to the coal, but none have as yet been observed as contained within it. The state of preservation, and the position in which the fishes occur, lead to the conclusion that they have been suddenly destroyed by water highly charged with decayed vegetable matter.

Mr. Strickland mentioned the discovery of an Ichthyosaurus by Mr. Marrett, and also exhibited a specimen of fossil fish with cycloidal scales from the lias, a fact not agreeing with the hypothesis of Agassiz. Mr. Marrett's discovery was made at Strensham, near Tewkesbury.

A letter was read from Mr. Allies, mentioning his

discovery of recent marine shells in gravel. He had found Turritella, and fragments of Cardium at Bromwich Hill, near Worcester, the former lying under indurated sand. In the same neighbourhood, at Kimsey, *Turbo littoreus* and *Nassa reticulata*, the last lying on marle at the bottom of the gravel-bed. At Bromwich Hill was found the tooth of a Mammoth.

Dr. Buckland now resigned the chair to Mr. Greenough, as a geographical paper was about to be read. It was a communication by Dr. Wilde on ancient Tyre. This gentleman some time since read a paper on the subject at the Royal Irish Academy, an abstract of which was published, and from which, at the time, we extracted what seemed most likely to interest our readers, his statement respecting the Tyrian dye [*ante*, page 438.]

Section D.—Zoology and Botany.

WEDNESDAY.

'On an Experiment in the Growth of Silk at Nottingham, made this Year,' by Mr. Felkin. A sample of yellow and pure white cocoons, part of those shown in the Model Room, and forming a portion of the results of this attempt at raising silk in England, were placed before the Section. They were exhibited in an undisturbed state (although the chrysalises had been killed), upon the twigs where they had been spun by the silk worms, the French and Italian mode of management being, so far as possible adopted throughout the entire course of the experiment. Bertezen produced equally good cocoons somewhere near London, in 1790, but beyond his presenting the silk reeled from them to the Society of Arts, and receiving their premium, only few particulars of his experiment are known. No practically important results followed this, the only previous successful attempt, so far as anything is on record. In the present instance the food supplied to the worms spinning the white silk (owing to the sudden and continued check to vegetation by severe east winds and frosts throughout May) was lettuce-leaves during the first three weeks after hatching, afterwards they were fed entirely upon mulberry leaves. Those spinning yellow silk were hatched fourteen days later, and were fed from the beginning upon mulberry leaves. Of those fed partly upon lettuce, 7-8ths died; on the contrary, the greatest loss in those fed altogether upon mulberry was from thirty to forty per cent. The average of loss upon the Continent of Europe is from 35 to 60 per cent., the latter being the usual loss under the management of the peasants. That division of these yellow ones which spun first, and which were most healthy, were subjected to a loss of only 10 to 20 per cent. The loss in China, owing to their superior skill and care, is often not more than one per cent. of those hatched. The hatching in question was of eggs procured from Italy, and this, as well as all the subsequent processes of feeding and spinning, took place in a warehouse in the centre of the town of Nottingham, amidst the usual noise, dust, and activity of a wholesale business in cotton goods, where the air would be in some degree tainted by the oily matters used in their fabrication. The weather for three weeks from the 14th of May was dry, but cold; then, after an interval of two weeks of fine weather, there was constant and most unusual humidity, so that it was almost impossible to refresh the air of the apartment, or avoid giving the food in a damp and heated state; especially as, from the number of worms 10,000), difficulty was experienced in obtaining mulberry leaves in a sufficient quantity, these having to be collected from, in some cases, 50 or 80 miles distance. Such was the continuance of rain in July, that the largest flood occurred ever remembered at that season of the year. To suit our variable climate, the temperature of the room was from the first kept low, varying from 70 to 55 degrees. Altogether, the circumstances under which this experiment was made, were very unpropitious. The time of spinning in Italy is usually six weeks after hatching. In Nottingham, the earliest did not spin until eight weeks after hatching; but those originally fed upon lettuce, did not spin until those fed entirely on mulberry had finished their cocoons; the lives of the former were therefore protracted full three weeks beyond the latter. On the whole, Mr. Felkin considered the experiment perfectly successful. The cocoons being placed in contrast with those (also on the table of the Section) of this year's growth, just received from the Milanese, presented but slight inferiority in size, weight, or compact formation. Of those grown in Nottingham, it took an average of 300 to weigh a pound, while of the best French or Italian, it takes at least 250. The English acclimated cocoons, weighing when dry, 1 to 1¼ grains, fed upon lettuce and mulberry; those of Bengal, rainy, (November) *bund*, 1¼ to 2 grains, fed on Indian mulberry; Italian, 3 to 6 grains, fed on white mulberry; Nottingham, 2¼ to 5 grains, fed on black mulberry; New Jersey, U.S. two crops a-year, 5 grains; and New Jersey, Mammoth, 6 to 8 grains, (the two last fed on Morus multicaulis,) were exhibited to the Section. It was then mentioned that the worms producing the smallest cocoons consume as much food as those making the largest; therefore, to produce a pound of silk from the smaller, the cost must be proportionately increased. The experiment shows that the best silk may be produced wherever the worm is of the suitable variety, and fed on its congenial food, combined with ordinary skill and care in management. Whether this production can be carried on to profit in England, or even in Ireland, is doubtful, labour and land being probably too high in both countries to compete with the existing production of silk; that it could be so in the West Indies and in our new colonies in the Pacific, is unquestionable. But the chief object in view, in bestowing the time and labour necessary to bring about the results which establish the fact that silk of the best quality could thus be grown here, was to show how the produce of this article, so well adapted to the soil and climate of that country and the condition of its multitudinous inhabitants, (and so necessary as raw material to one of our chief manufactures) might be greatly improved in quality, and indefinitely increased in quantity, *in Hindoostan*. There, labour is cheaper than anywhere besides, and land unoccupied and waste, but perfectly suitable for the mulberry, is plentiful; so that by not confining the cultivation of silk to the marshy Delta of the Ganges, as at present, but introducing into the more elevated and even mountainous parts of Hindoostan, &c., the superior kinds of silkworms and mulberry trees so long grown in the south of Europe, and recently brought forward with vast enthusiasm in the United States of North America, the whole world might be supplied from India, with raw silk, at half its present cost—a cost increased by the demand greatly exceeding the supply, so as to have compelled us to pay four instead of three millions sterling a-year, during the last four years, for the same weight of material, and thus greatly to limit the extent, and even to risk the safety of the silk manufacture itself.

General Briggs observed that many of the worms fed on the *Zizyphus jujube*, a plant belonging to the natural order Rhamnaceæ; at Nootka and Poonah, however, the mulberry had been used. The failure of experiments which had been lately made he attributed to the attempt at feeding the Indian worm on European food; whereas, both the worm and the food should be introduced, if we expected to procure silk from India.—Dr. Daubeny referred to Dr. Royle's observations on plants with a milky juice; he supposed these alone were the plants on which the silk-worm fed; these plants all contained caoutchouc: perhaps a knowledge of such a fact was important.—Mr. Felkin observed that his worms liked nothing so well as mulberry; there were three kinds of mulberry which he had used, the white, red, and brown; and if these three were put amongst them, they would eat the white first, then the red, and last the brown.—In reply to an inquiry from Mr. Lankester, Mr. Felkin stated that he had used the cultivated or garden lettuce to feed his worms, and had not tried the wild species.

The Secretary read a paper by Mr. Brand, 'On the Statistics of British Botany,' being an appendix to a scheme for arranging the Edinburgh Botanical Society's British Herbarium. This paper consisted chiefly of remarks on the Catalogues of Plants, on which Mr. H. C. Watson had founded his conclusions in his work on the Geographical Distribution of the Plants of Great Britain. Proof sheets of the Catalogue formed from this source were exhibited to the Section. Also the proof sheet of a catalogue for arranging the Society's General Herbarium.

'Some Observations on Whales, in connexion with the account of the Remains of a Whale recently discovered at Durham,' by Mr. George T. Fox.

The University of Durham, requiring increased accommodation for students, determined this year to appropriate the old Tower of Durham Castle for such purpose. This tower, or master-keep, which is considered as of Norman structure, (though probably great part of what remains was erected in the reign of Edward III., by Bishop Hatfield,) had long been going to decay, and was at length, about fifty years ago, dismantled, by reducing the upper story, and throwing the materials down into the interior. In clearing out the rubbish for the purpose above mentioned, the workmen found the basement story to consist of arched crypts, much broken. Amongst the rubbish in these crypts, or cellars, they were suddenly surprised by finding several large bones, and as they advanced these accumulated from time to time, until twenty vertebræ, and about the same number of ribs, of enormous size, were taken out; and in a crypt or room on the opposite side of the tower, two large jaw bones were laid bare. This latter discovery enabled me, (said Mr. Fox,) to determine, from the form and position of the jaws, (for they were not yet excavated,) that the bones belonged to a spermaceti whale. The discovery excited considerable interest in the town. But while the inquiries, to which the strange circumstance had given rise, were going on, the Rev. James Raine discovered a curious and interesting letter, in a MS. volume of the late Mr. Surtees' collection, relative to the history of the Castle of Durham, which at once accounted for the discovery of animal remains under such circumstances.

Copy of a letter from John Cosin, Bishop of Durham, addressed to his Secretary, Mr. Miles Stapylton.

Pall Mall, London, June 20, 1661.

Mr. Stapylton.—I have received yours of the 15th instant, wherein you write, that as you have been informed by ye bailiff of Earington, there hath of late beene cast up uppon ye sea shore within my said manor a royall fish, but you trouble not yourself to assure me of what kinde it be, (truly your omissions of this sort are both numerous and perplexing,) and you proceed to ask my will and pleasure touching ye same. Now in reply to this your question, my answer is as followeth, and I pray you to note it well. Do with the flesh of this fish, of whatever kinde it be, that which seemeth good unto you, for by this time, methinks, it stinketh, and will satisfie neither your palate nor your purse; but forasmuch as I well remember that in the time of my assured friend and patron, of happy memory, Bishop Morton, who fell on evil days, there did hang up in the kitchen of his castle of Duresme a right stately skeleton of a fish, perchance of this sort, which was much admired by his most sacred majestie King Charles in A.D. 1633, but which was plucked down and destroyed by that knave Thomas Andrews, who did purchase the said castle from those still greater knaves, who did steal and sell the same. I will that the bones of the fish you mention, so it be of a convenient size, be carefully cleansed from all impurities which may adhere to the same, and then being reduced into the form and fashion of a skeleton, I would have hung up for their preservation and the admiration of the curious, not in my kitchen aforesaid, in which there may be lack of room, but in some meet place in the old tower of my castle, which hath long ceased to be inhabited, to be chosen at your and Mr. Farrer his discretion.

I pray you begin to make provision for the due treatment of his Majesties Justices of Assize, which, as this is my first yeare, must be managed sumptuously, but I would have you to remember without waste. The bailiff of Derlington did write of one William Man, of Piersebridge, who is and hath been of long time noted for his fat oxen. You will do well to let my Lords Judges taste his beef. I would also have you procure some Westfalia hams and Holand cheeses, and look there be ready some caggs of sturgeon, to be got where and as you can. Touching these matters you shall have further premonition in due time from

Your very loveing friend,
Jo. Duresme.

Postsc.—His Matie hath this day assured the house touching the Act of Indemnitie, and hasteneth to make a progress through some parts of his kingdom, and first to Worcr to offer up thanks for his delivce there.

This letter clearly shows that the bones discovered in Durham Castle belonged to an animal cast on shore on the coast of Durham, at Earington, and the date (1661) proves it to be the oldest whale of the kind recorded to have been found on the British coast. The remains of the animal, when collected, were found to consist of twenty-six vertebræ, fourteen ribs, and two lower jaws, of the great blunt-headed Catodon (*Physeter macrocephalus*). Many fragments had been broken off, but the whole being carefully gathered by the workmen, they were easily joined, being found to coincide with the rest; and it may, therefore, be concluded, that no more of the whale, notwithstanding the somewhat peremptory order of Bishop Cosin, had been brought to his Castle.

XUM

These have been set up in the Museum of Durham University, and the ribs being attached to the vertebræ, and the jaws placed in front, they form an interesting preparation, and convey no very imperfect idea of the form of the animal. The entire subject of Cetology being at the time of this capture so obscure, it is no wonder that the Bishop's secretary was unable to comply with his master's mandate, by informing him of what kind this animal, or *this fish*, was; for though there is little doubt that this species had, amongst others, been observed from the earliest times, yet the first authentic account of it, as a species, is that given by Clusius, in 1605, from an individual thrown ashore, in 1598, at Berchey, in Holland, near Scheveling, as is stated by Cuvier;* the head of which, much mutilated, he conjectures to be that still preserved in the church at Scheveling. Many other captures are recorded by Cuvier, though none, except that related by Clusius, are prior in time to Bishop Cosin's. These, however, another came ashore at Cresswell, in Northumberland, in August 1822; and on the 11th of that month, several were seen sporting in the deep off the same coast. Amongst the bones of this whale, are found the atlas, the cervical bone, nine dorsal and ten lumbar vertebræ, out of sixty, in the whole,—the entire tail, or caudal portion, being wanting; and there are only half the proper number of ribs—fourteen, out of twenty-eight. The bones of the cranium and face, and the arm bones (or pectoral fins), were not found. One of the ribs was attended with a curious coincidence. In the crypt of the private chapel of Durham Castle had stood, for many years, an old oak chest, popularly known as St. Cuthbert's Chest, of which a figure was given in Hutchinson's History, at vol. 2, p. 248, and in which chest had always remained a large bone, usually called the Giant's Bone. When Bishop Cosin's whale was discovered, this bone was found to be the corresponding one of the first rib, and thus was once more brought into connexion with its fellow. From the thickness of the vertebræ, some of which, in the body of the bone, are not less than twelve inches, and the supposed length of the lower jaws, part of which is broken off, I should conjecture that this whale was above fifty feet long. It is unnecessary for me to notice here that cetaceous animals are true mammalia, and have no other connexion with fish than their form. The definition of true cetacea is, however, less agreed on; and to draw the line between them and the other orders of mammalia, has hitherto been somewhat difficult. They may, however, be distinguished as a distinct order, by attending to a few points of character. First, they are bipeds, or having only fore arms, and no hind extremities. Their teeth (where they are found) are uniform, and not divisible into sets of molars, canine, and incisive. The apparatus for clearing themselves of the water, which they are exposed to swallow, is the blowing organs, and which have given them their ancient as well as modern name of *Physeter* (from $\phi\upsilon\omega$, to blow); their stomach, which is multilocular, and the bones of the ear, which are distinct from the temporal bones, being attached to the head by muscle or ligament, are sufficient, one would think, to distinguish the true cetacea; and yet we find Linnæus himself has overlooked such distinctions, or perhaps, from the difficulty of investigation, was unable to attend to them. He has placed, at least one true cetaceous animal, the Lamantin, or Manati, in his genus Trichechus, along with the Morse, which possesses four feet, and has the other properties of a distinct form of teeth. The Lamantin, with its biped character, has, therefore, been removed by Cuvier to the true cetacea, along with the Dugong, another East Indian animal of the same order. Besides the larger ordinal groups, good generic characters, since the multiplication of the species, are somewhat difficult. The extraordinary structure of the lower jaw in the spermaceti whale might serve as a good generic distinction. The breadth of the jaws (in this specimen) at the basilar extremity is above two feet, but the bone, with the exception of the margin, is as thin as a sheet of paper or plate of tin, and of a spoon-shaped form; thus giving the means of attachment for muscles without weight. The same construction is found in the whale called Hyperoodon Butzkopf,† and the circumstance would lead to the belief that these two whales should be placed near together, if not in the same genus. I speak from the examination of a head of the latter species, lately brought from the Greenland Seas, and which is now in the Newcastle Museum. In this, the remarkable shape of the bony crests, which emanate from the maxillary bones, like two great flag stones, is most worthy of observation. The circumstance of anything in the nature of teeth being placed in the palate, which has occasioned the generic character and name to be given to this species, is extremely doubtful, and contrary to all analogy. There is nothing of the kind found in the specimen here referred to. The two teeth, however, in the lower jaw, as described by Hunter, Dale, and others, are found in this specimen, and confirm the resemblance of this species to the spermaceti whale.

(The Section was adjourned at one o'clock, to enable the members to attend the exhibition of the Horticultural Society at the Botanic Gardens.)

* See 'Ossemens Fossiles,' v. 8, p. 193.

† See 'Bell's Brit. Quadr.'

Section F.—Statistics.—Tuesday.

Mr. Rawson then read an elaborate paper, (which was concluded at the meeting on Wednesday,) 'On the Criminal Statistics of England and Wales.'—We can but refer to some of the more general facts and conclusions. Thus, the numbers of the two sexes in European countries is nearly equal, the preponderance being somewhat on the side of the females; yet, both in England and France, the proportion of male to female criminals is about 4 to 1, and that result varies but slightly during several years. The average annual number of persons committed or bailed to take their trial during the last five years, was 22,174; the difference between the highest and lowest annual number during the period, was 14 per cent. Taking the twenty principal offences in their relative order, according to the number of persons annually committed for each, they will stand thus:—

1. Simple larceny	12,303
2. Stealing from the person	1,539
3. Housebreaking and burglary united	1,007
4. Stealing by servants	955
5. Assaults	756
6. Receiving stolen goods	683
7. Riot and breach of the peace	607
8. Resisting or refusing to aid peace officers	579
9. Frauds and attempts to defraud	425
10. Robbery and attempts at robbery	392
11. Uttering counterfeit coin	318
12. Sheep-stealing	292
13. Embezzlement	262
14. Manslaughter	209
15. Rape and attempts to ravish	188
16. Stealing from houses to the value of 5*l.*	178
17. Stealing of fixtures, trees, and shrubs	163
18. Horse-stealing	155
19. Poaching	153
20. Keeping disorderly houses	145

The ages of the offenders are divided in the official Tables into eight periods, and it is a curious fact that the greatest variation during the last three years, in the proportion of any class of criminals at the same period of life, has not exceeded $\frac{1}{5}$ per cent.

Centesimal Proportion of Offenders at each Age.

	1836.	1837.	1838.	Greatest difference.
Under 12 years	1.84	1.52	1.58	0.32
From 12 to 16	9.71	9.72	9.92	0.21
17 „ 21	29.03	29.23	29.13	0.20
22 „ 30	31.42	31.74	31.24	0.50
31 „ 40	14.43	14.56	14.75	0.32
41 „ 50	6.76	6.65	7.02	0.26
51 „ 60	3.33	3.24	3.00	0.33
Above 60	1.40	1.55	1 58	0.18
Not ascertained	2.08	1.79	1.78	
Total	100.	100.	100.	

The average population of England and Wales, during the five years under examination, may be assumed to be 15,026,447. This number is obtained in the following manner. The mean of the five years is 1836, which is also the mean of the decennial period from 1831 to 1841. The population of that year may, therefore, be found, by adding to that of 1831 at a rate equal to half the increase during the previous decennial period. Adopting this total, and the proportions above given, the numbers existing at each period of life will be as follows:—

Under 16	5,875,340
From 16 to 20	1,502,644
21 „ 30	2,374,178
31 „ 40	1,788,147
41 „ 50	1,412,486
51 „ 60	991,745
Above 60	1,081,907
Total	15,026,447

The following, therefore, is the proportion of offenders annually committed, to the population at each interval of age, adding to the number under 15 one-fifth of the number between 16 and 21, and taking away from that between 21 and 30 one-tenth, in order to equalize the periods of comparison:—

No. of Offences annually committed on the average of the five years.	Proportion of offences to the Population.
Under 17 2,539	One offence in 2,432 individuals.
From 17 to 21 6,468	232 „
22 „ 30 6,997	305 „
31 „ 40 3,184	561 „
41 „ 50 1,501	941 „
51 „ 60 703	1,410 „
Above 60 319	3,391 „

This table, it must be borne in mind, does not serve to show the positive frequency of crime, but merely its relative frequency at different ages, because it may be presumed that the ages of offenders summarily convicted do not materially differ from those of offenders committed for trial. There is also a circumstance which will in some degree disturb the above proportions. The number of persons employed abroad in the army and at sea, will considerably diminish the proportion remaining at home, and liable to the commission of crime, between 18 and 35, and cause a corresponding influence upon the other periods of life. Further it appeared, 1st, that crime prevails to the greatest extent in large towns;—2nd, the difference between manufacturing and agricultural counties, in which the influence of large towns is not much felt, is not very great;—3rd, crime is very much below the average in mining counties (Cornwall, Glamorgan, Durham, Northumberland);—4th, and it is still less frequent in Wales and the mountainous districts of the north of England. In all the mining counties, widely separated as they are, the proportion of criminals, according to these tables, is less than half the average; and Derbyshire, in which much mining is carried on, but which was placed by Mr. Rawson among the manufacturing counties, scarcely exceeds half the average. With regard, however, to the amount, and even the character, of crime, Mr. Rawson observed, that our criminal returns are very imperfect, and if taken by themselves, as the index of either, would lead to the gravest error. They exhibit only the persons committed for trial before the courts of quarter sessions and circuit assizes, or in local courts, and do not include those summarily convicted or discharged by magistrates, or by petty sessions. It will scarcely be believed, that of these last no general record exists: the only information that is complete for the whole of England and Wales, is the number of persons sentenced to imprisonment upon summary convictions, which has been collected and published by the Inspectors of Prisons, in their Report for 1838; but this is only for one year; and the number of offenders tried and acquitted, or sentenced to fines, or other punishments, has never been ascertained. The average annual number of convictions before the quarter sessions, circuit assizes, and local courts, during the five years, from 1834 to 1838, was 15,874; the number of persons sentenced by summary conviction to imprisonment during the year ended Michaelmas, 1837, was 59,364. If, therefore, the proportion of acquittals to convictions by magistrates be not less than that occurring before the higher courts,—and there is every reason to believe that it is greater,—the number of cases summarily dealt with by the former, is at least four times as great as the number brought before the higher courts. But the returns made by the Commissioners of Metropolitan Police, enable us to form a more exact idea of the number of summary convictions. In 1837, the number of persons convicted by magistrates within the metropolitan district, for offences, exclusive of drunkenness and other mere infractions of police, was three times as great as the number committed for trial; and the number acquitted was four times the number of commitments: so that the number charged was altogether eight times as great as the number brought before the higher courts. It is pro-

bable that the proportion of summary convictions to commitments is higher in the rural districts, where the person charged must generally suffer a longer imprisonment before he can be brought to the assizes, than in London, where he may be tried almost immediately, before the Central Criminal Court. On the other hand, the existence and continual presence of an efficient police force in London, causes a greater number of persons to be arrested on justifiable suspicion, against whom the legal evidence is insufficient to insure a conviction. It is obvious, therefore, that the criminal returns, in their present form, neither indicate the whole number of persons apprehended or punished for serious offences, nor afford any information whatever with regard to petty offences which form by far the most numerous class.

WEDNESDAY.

After the conclusion of the foregoing paper, the following paper was read.

A Report by the Manchester Statistical Society, on the Borough of Kingston-upon-Hull.—Circulating Libraries, in the borough of Kingston-upon-Hull, may be ranged under the following heads:—1. Public Subscription Libraries. 2. Libraries attached to Public Institutions. 3. Congregational Libraries. 4. Libraries attached to Sunday Schools. 5. Private Circulating Libraries.

These public subscription libraries contain an extensive assortment of works in every department of literature. There are four, containing 25,671 volumes; of which, 2,537, or 9.88 per cent., are Theology and Ecclesiastical History; 2,674, or 10.41 per cent., are Jurisprudence and Political Economy; 7,549, or 29.41 per cent., are History and Biography; 9,566, or 37.27 per cent., are works on the Arts, Sciences, and general Literature; and 3,345, or 13.03 per cent., are Novels, Romances, and works of imagination. The circulation is 102,180 volumes per annum, affording an average of 126 volumes annually to each member. There are four libraries connected with *public institutions*, and they contain 2,920 volumes, of which, 467, or 15.99 per cent., are works in Theology and Ecclesiastical History; 26, or .89 per cent., are on Jurisprudence and Political Economy; 1,016, or 34.80 per cent., are History and Biography; 1,397, or 47.84 per cent., are Arts, Sciences, and general Literature, and 14, or .48 per cent., are Novels, Romances, and works of imagination. This description of libraries appears to contain the whole amount of publications of a practical character, exclusive of religious works, which can be fairly regarded as coming within the reach of the working classes, and the whole of these, with the exception of 200 volumes, are in the library of the Mechanics' Institution, the number of volumes in which, is 2,260, the average annual circulation being 17,992, exhibiting an average reading of 52 volumes per annum to each subscriber. There are ten congregational libraries attached to churches or chapels, and designed to promote the religious instruction of the congregation. In these libraries are 2,994 volumes, which are, with scarcely an exception, of a religious character. The average circulation is 10,088 volumes per annum. The number of persons having access to these libraries, not being in all cases ascertainable, no estimate of the average number of volumes to each can be made. There are 28 libraries attached to Sunday schools, which have 5,655 volumes, exclusively of a religious tendency, with an annual circulation of 48,942 volumes, which takes place chiefly among the senior scholars and their teachers. Nearly the whole of the Sunday school libraries contain a variety of works of fiction, having, however, a religious object. There are 11 private circulating libraries, having 17,474 volumes, 8 of which, or .04 per cent., are works in Theology and Ecclesiastical History; 9, or .05 per cent., Jurisprudence and Political Economy; 220, or 1.26 per cent., History and Biography; 26, or .14 per cent., Arts, Sciences, and general Literature; and 17,211, or 98.51 per cent., Novels, Romances, and works of imagination. The average circulation could not be correctly ascertained, but the condition of the books, the number of libraries, and observations which fell from the proprietors, prove that it is very great, and is confined to the middle and operative classes. Laying out of view libraries originated by public-spirited individuals, for the benefit of these classes, and those promoted from religious motives, the taste of readers among the middle and working classes is strongly indicated by the description of works of which private circulating libraries are composed. The majority of works in these libraries may be characterized as mere trash, and not a few in some of them are of a more objectionable nature. When it is considered that the young form a large portion of the supporters of these establishments, and that early reading exercises no inconsiderable influence in the formation of character, it is much to be regretted, that no efforts commensurate with the wants of the public have yet been made to supply a desideratum, which the progress of education is rapidly creating.

SECTION G.—MECHANICAL SCIENCE.

TUESDAY.

A paper was read, in which Mr. Beart gave an account of what he called a method of filtering liquids by "using a perforated packed piston, in a cylinder or other shaped vessel, and making the piston itself the filtering medium"—that is to say, the vessel being air-tight, on raising the piston a partial vacuum is created, and thus "the atmospheric pressure is added to the hydrostatic pressure."

Mr. Hawkins was of opinion, that, in some cases, pressure was worse than useless, particularly where long-continued filtration is required. The late Mr. Howard, whose patent on sugar refining was well known, introduced a principle, founded on the pressure of a column of syrup of about twenty feet, of the high specific gravity of 1.4; but it required a very large quantity to be run through before the liquor was clear, and the machine was soon clogged up. On the substitution of a pressure of but two or three feet, the machine answered very well.—Dr. Ure differed from Mr. Hawkins with respect to pressure as applied to filtration at sugar-houses.

'Resistance of Air to Railway Trains,' by Dr. Lardner. [The reading of this paper was concluded on Thursday.]

At the Liverpool meeting of the Association, in the autumn of 1837, an inquiry was undertaken by Dr. Lardner, in connexion with some other members of the Association, with a view to determine the mean numerical value of what were called *Railway Constants* by analogy to similar numerical quantities in other branches of science and art. *Constants* is a technical name given to certain quantities, more especially in astronomical and physical science, which enter largely into general calculations. As an example of these, may be mentioned, the height through which a body falls in a second of time; the length of a seconds pendulum; the ratio of the circumference of a circle to its diameter, and so on. A project of a magnificent kind was formerly suggested by Mr. Babbage, for the determination of the mean numerical values of the "Constants of Nature and Art." Among these quantities which enter railway calculations, that which is of the greatest practical importance is, the number by which is expressed the proportion which the tractive power, necessary to move loads on a railway, bears to the weight of the loads it moves. The great importance of this will be readily perceived, if it be considered that such is in fact in a great degree the ratio of the cost to the work done. Accordingly, the first point to which this inquiry was directed was, the solution of that problem.

The resistance opposed by a railway train, to the power which draws it, arises from several causes; 1st, the friction or attrition of the axles of the wheels in their bearings; 2nd, the rolling friction of the tires of the wheels upon the rails; 3rd, the resistance of the air to the train moving through it. These are all the causes which produce resistance in the train moved. But independently of these, there are resistances peculiar to the engine, arising from the friction or attrition of the various parts of the machinery which are in motion, and which suffer a pressure or strain, depending on the resistance of the load drawn; also the re-action of the steam, escaping from the blast pipe on the other side of the piston, and other similar causes. But to simplify the inquiry in the first instance, the resistance of the engine was put aside, and the investigation was directed exclusively to the resistance of the train. Various methods presented themselves for testing this. The most direct method was the application of an instrument called a dynamometer in front of the train, by which the train could be drawn, and which would afford a direct measure of the force with which it was so drawn. This method, however, was subject to several objections. It was found that the surface of rails, commonly regarded as level, were really subject to variations of inclination through small distances, which produced upon the dynamometer sudden jerks, which caused its index to play between such extreme limits as to render it impossible to arrive at any useful mean of its indications. Besides this, if such an instrument were used to estimate the resistance of a train, moving with any considerable speed, it must necessarily be placed between the engine and the train, and would therefore show only a modified effect of the atmospheric resistance; inasmuch as the engine would have already encountered and removed a portion of that resistance before the instrument could be affected by it. Numerous experiments were nevertheless made with such instruments, and it was not abandoned until its failure was rendered practically manifest. Another method occurred to Dr. Lardner for determining that portion of the resistance which is due to friction, by attaching to an engine such a load as the engine is capable of moving, at a slow uniform velocity, up a given inclined plane, and then taking the same load to a more steep inclined plane and detaching from it as many waggons as would enable it to move up the steeper inclined plane at the same slow speed as that at which it moved up the less steep inclined plane. Under these circumstances it might be safely assumed, that the absolute resistance to the engine would be in both cases the same, and the difference of the gravity of the two inclined planes would, in such a case, by the aid of mathematical principles, and by formulæ, which Dr. Lardner constructed, give the resistance due to the waggons detached in passing from the less to the more steep inclined plane. This method would be attended with the advantage of giving a result, in a great degree, free from the atmospheric resistance, and therefore would furnish a near approximation to the value of the friction, properly so called. As the motion would be slow, and a part of the train would be in front of the waggons detached, the atmospheric resistance would necessarily have but a very slight effect. As no opportunity, however, presented itself of executing experiments upon this principle, he did not occupy the time of the Section in enlarging upon it.

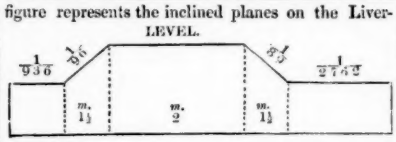
After much consideration, he arrived at the conclusion, that the method of investigation which was calculated to give the most satisfactory results as to the resistance of railway trains was, by observing their motion down steep inclined planes. This method had been already practised, and its principles will be easily rendered intelligible. If a body be placed on a steep inclined plane and allowed to descend it by the force of its gravity, its motion down the inclined plane would be accelerated. If the causes of resistance affecting the body were uniform in their effect, and independent of the velocity, then the motion of the body down the inclined plane would be uniformly accelerated, just as a body falling freely and perpendicularly by gravity would, apart from the atmospheric resistance. By being uniformly accelerated, is meant this, that the increase of velocity which takes place every second of time is the same. Thus, whatever velocity is acquired by the body at the end of the 1st second, having descended from a state of rest, twice that velocity will be acquired at the end of the 2nd second, and thrice that velocity at the end of the 3rd second, and so on. It is evident, therefore, that a body, subject to such acceleration, would go on increasing its speed without any limitation. As the intensity of the force of gravity is exactly known, and as the effect produced in diminishing that intensity by a plane of given inclination is a matter of easy and exact calculation, nothing can be more certain than the computation of the motion which a body would have down an inclined plane if that body were subject to no resistance. Now, if it be subject to resistance, the comparison of its actual and observed motion, with the motion which it would have, being subject to no resistance, computed, as just explained, ought to supply means of determining the amount of the resistance; but to do so it is necessary to know, to a certain extent, the law of the resistance which is in operation.

The resistance arising from attrition or friction, whether it be of surfaces rubbing one on another in the manner of a sledge, or rolling one on another as the tire of a wheel rolls upon a rail, or subject to the kind of attrition which takes place between the axle of a wheel and its bearings, have been all submitted to most elaborate and careful experimental inquiry; and the laws of the resistances, arising from these, have been fully and clearly developed. The question of friction was formerly investigated by Coulomb, Ximenes, Vince, and others; but recently a more extensive and valuable series of experiments on the subject, than was ever before executed, has been made, under the order of the French government, by M. Morin, and their details made public. The results of these fully corroborate the laws which had already resulted from the inquiries of the philosophers who before examined the subject, which laws are as follows:—1st, the resistance arising from friction, whether of rubbing or rolling, or that between the axle of a wheel and its bearings, are, when other things are the same, independent of the velocity; 2nd, other things being the same, these resistances are directly proportional to the amount of pressure on the rubbing surfaces, and independent of the magnitude of these surfaces. To these laws, taken within practical limits, there can scarcely be said to be an exception. The extreme cases which become exceptional, having no application whatever to the present inquiry, it will not be necessary to regard them.

The immediate consequence, from the friction being the same at all velocities, is, that it is a uniformly retarding force, that is to say, that it destroys in the moving body on which it acts equal velocities in equal times. Thus, if it destroy a certain amount of speed at the end of one second, it will destroy twice that at the end of two seconds, three times at the end of three seconds, and so on. Now if a railway train, moving down a steep inclined plane, were subject to no other resistances than those arising from friction, it is evident that it would move down the plane with a uniformly accelerated motion, although that motion would be less accelerated than if it were subject to no resistance. In other words, the *kind* of motion affecting it would be the same as if there was no resistance, the *degree* of motion alone being altered. It has been stated that, subject to no resistance, certain speeds would be gained by the train in one, two, three seconds. These speeds would be those due to the gravity of the plane. These speeds would, however, now be diminished by the amount of velocity destroyed by the friction; and as this latter would be increased in the same proportion as the speed imparted by gravity, the descending body would be accelerated by a uniform force, equal to the difference between the acceleration of gravity and the retardation of friction. In a word, both of these being uniform and independent of the velocity, their difference, that is, the effective accelerating force, down the plane will be uniform and independent of the velocity.

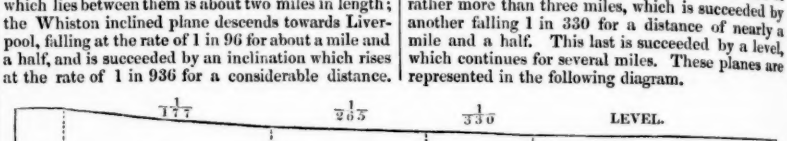
Such was the reasoning on which was based all former investigations of the resistance of railway trains, by observing their motions down inclined planes. The acceleration due to gravity was calculated; the actual acceleration moving down the plane was observed, and the difference was supposed to give the retarding force due to the resistance. It is evident that by such a mode of proceeding, the effect of the atmosphere, or of any other cause which produced a retardation increasing with the speed, was either neglected, or was considered to be of such trifling amount, compared with the resistance due to friction, that it might be regarded as involved in the estimate of resistance thus obtained with sufficient accuracy for practical purposes. Such, indeed, was the impression on Dr. Lardner's own mind when he commenced this investigation, and he accordingly proceeded on the same principles as those adopted by other inquirers, except that in the formulæ he included the effect of the gyration of the wheels, which was neglected in the calculations of M. de Pambour, and which omission entailed an error upon his results.

With a view to determine the actual acceleration of a train down an inclined plane, the Whiston and Sutton inclined planes on the Liverpool and Manchester Railway, and a series of inclines on the Grand Junction Railway, extending from Madeley for several miles towards Crewe, were selected. This figure represents the inclined planes on the Liverpool and Manchester Railway. The summit level which lies between them is about two miles in length; the Whiston inclined plane descends towards Liverpool, falling at the rate of 1 in 96 for about a mile and a half, and is succeeded by an inclination which rises at the rate of 1 in 936 for a considerable distance.



The Sutton inclined plane falls, towards Manchester at the rate of 1 in 89 for about a mile and a half, and is succeeded by a portion of the line nearly level, for a considerable distance towards Manchester.

The first plane on the Grand Junction line descended from the Madeley summit towards Crewe, falling at the rate of 1 in 177 for a distance of three miles and a quarter; this is succeeded by another which falls at the rate of 1 in 265 for a distance of rather more than three miles, which is succeeded by another falling 1 in 330 for a distance of nearly a mile and a half. This last is succeeded by a level, which continues for several miles. These planes are represented in the following diagram.



The Whiston and Sutton inclined planes on the Liverpool and Manchester line, are straight throughout nearly their whole length. The Madeley inclines, represented in the diagram, are, in some places, curved with a radius of a mile, turning alternately to the right and to the left; but considerable portions of them are straight. A stake, marked 0, was placed at the summit of each inclined plane, and the length of the plane descending was divided out by stakes marked successively, 1, 2, 3, &c., into spaces of one hundred yards. Watches, by which a second could be without difficulty bisected, were provided, and the moment of passing the successive stakes was observed to within, at the most, half a second of the truth. Every care was taken to confer the last degree of accuracy upon these observations; one person was employed to call out the moment of passing each stake; another, supplied with a watch, declared the time, and the third took it down; and in many cases these were checked by having two sets of observers.

A few experiments conducted in this manner soon made it manifest that the motion down an inclined plane was not, as has been hitherto supposed, uniformly accelerated. It was found, for example, that the increase of speed in each successive interval of time was not the same, but was continually less as the motion increased. In other words, the degree of acceleration *was gradually diminished*. Now this was an effect evidently indicating an increase of the resistance with the increase of speed, and naturally suggested the idea that the atmosphere must have had a more considerable effect than had been supposed. The mathematical formulæ, commonly used for the determination of resistance, are founded, as has been already stated, on the supposition that the resistance is independent of the speed. These formulæ were now applied to the motion of the train down the inclined planes for short distances, measured from the points at which the trains were respectively started, so that within the range of their application the train might acquire but very little speed, and therefore that the result might be only slightly affected by the atmosphere. The results of such calculations, applied to the motion of the train for 100, 200, or 300 yards, were found to give a resistance, amounting to from the 400th to the 450th of the load. This was not half the amount of the common estimate of the resistance to railway trains, which was about the 250th part of the load, that resistance having been assumed to be the same at all speeds. It occurred to Dr. Lardner now to attempt an approximation at the resistance by another process, as follows:—trains were brought to a level and straight line of railway, and, being driven by an engine until they attained a speed of 30 to 35 miles an hour, they were dismissed, and allowed to run until, being gradually retarded, they were brought to rest. The line being staked out as before the moments of passing, the successive stakes were observed, and the rate at which the train was retarded by the resisting forces was observed, for each 100 yards over which it moved; a calculation was made of the amount of resistance by the usual formulæ, founded on the supposition that the resistance is independent of the speed; but these calculations being confined to the first 100, 200, or 300 yards, might be considered as giving a fair approximation, since the change of velocity throughout that distance was not very considerable. The result of such observations indicated a resistance amounting to from a ninetieth to a hundredth of the load. It will be observed that in these last cases the velocity of the train, at which the resistance was computed, was very considerable, while, in the former cases, taking the initial motion down an inclined plane, it was very small. The inference, of course, which followed, supposing such calculations to give correct results, was, that the actual resistance at high speeds was many times more than when the motion is slow. Since, however, these methods of calculation could be regarded as only approximative, and were, in fact, based on principles which were only true on the supposition that the resistance was independent of the velocity, which supposition was contradicted by the results of the calculations themselves, it was considered necessary to resort to some other and more correct method of determining the resistance.

If it be admitted that the atmosphere produces any considerable resistance, since that resistance must increase in a very high ratio with the speed, it would follow, that if an inclined plane of sufficient length could be obtained, the motion of a train would continue to be accelerated until it would obtain a velocity which would produce *a resistance from the air, such as, combined with friction, would be equal to the gravitation down the plane.* When such a velocity should be attained, the moving force down the plane, being equal to the resisting force, no further acceleration would take place. As it was thought, however, that the inclined planes, which were accessible, might not be of sufficient length to produce this effect with such trains as it was possible at that time to obtain for experiments, it occurred to Dr. Lardner that the end would be equally attained by starting the train from the top of the inclined plane at a considerable speed; that thus, the acceleration it would receive while descending being added to its initial speed, might be expected to give that velocity, at some point of the descent which would be attended by a resistance equal to the gravitation of the train down the plane; at which point, therefore, acceleration might be expected to cease, and a uniform motion to be maintained to the bottom of the plane.

The first experiments tried with this view were completely successful, and the result obtained was in exact accordance with what had been anticipated. On the summit level of the Liverpool and Manchester Railway, marked in the diagram No. 1, a train of four carriages was placed, and was drawn by an engine to the top of the Whiston plane ($\frac{1}{96}$), from whence it was started at a considerable speed. Its motion was accelerated for a short distance, but soon became perfectly uniform; and it descended through the greater part of the plane at the uniform velocity of 31.2 miles an hour. This experiment was again repeated with the same coaches, increasing the load. As was expected from the gravitation of the increased load, a greater velocity was now obtained; but still a uniform velocity resulted, and the train descended the plane with the most perfectly uniform motion, at 33.72 miles an hour. These experiments were tried repeatedly on the same day with the same results. A moderate wind blew down the plane, so that the inference was, that this train, in a calm atmosphere, would have suffered a resistance greater than

a ninety-sixth part of its weight, at the velocities above mentioned. This experiment, with a train of four coaches, was repeated on the Sutton plane, and on the inclines near Madeley, represented in the diagram; and in every case a uniform velocity was obtained,—this velocity diminishing with the steepness of the plane.

When these first experiments became known, one of the objections brought against them was, that a train of four coaches was so light, that a moderate atmospheric resistance would retard it; and that as, in the practical working of railways, such trains were never used, the results obtained had no practical utility; and that with heavy trains, such as those actually used on railways, no such results would ensue. This objection, among others, was advanced in a Report published by Mr. Brunel, the engineer of the Great Western Railway. In order to meet this objection, trains of greater magnitude were subsequently tried, and the same results ensued—a uniform velocity being attained in every case in which the train could be started from the top of the plane with a sufficiently high speed. In the following table is exhibited the mean results of a vast number of experiments tried with trains of four, six, and eight coaches. In the third column, the letter expresses generally the state of the wind—F fair, A adverse, C moderately calm, and CC a dead calm; the fourth column gives the gradient down which the motion took place; and in the last column is expressed, in miles per hour, the uniform velocities which the train attained, and which it preserved through a length of the plane sufficiently considerable to show that it would not have received any further increase.

Number of Coaches.	Weight.	Wind.	Gradient.	Uniform velocity attained.
	Tons.		One in	miles per h.
4	15.6	F	96	31.2
4	18.	F	96	33.72
4	18.	F	177	21.25
4	20.5	F	177	22.9
4	20.5	F	89	38.25
4	20.2	F	265	19.13
6	27.5	A	89	32.3
6	27.5	F	89	37.5
6	27.5	F	96	34.6
6	27.5	A	96	27.8
6	34.5	C	89	35.3
8	36.5	F	89	> 36.5
8	40.75	F	177	26.15
8	40.75	S	177	< 17.7
8	40.75	CC	89	31.4

The last experiment with a train of eight coaches, weighing nearly forty tons, shows that, in a dead calm, the resistance of *that train at 31½ miles an hour amounted to the eighty-ninth part of its weight; whereas the common estimate of the resistance of such a train at that speed has been hitherto about the 250th part of its weight!* This fact alone, were it unconnected with any others, would sufficiently illustrate the enormous extent of error which has prevailed hitherto in such estimations in railway practice. The third experiment with eight carriages was made with a side wind, the effect of which is abundantly manifested by the speed expressed in the last column. While the same train, moving with a fair wind down the Madeley plane, had a resistance equal to the 177th of its weight, at 26 miles an hour, its resistance with a side wind was of greater amount at 17.7 miles an hour. The relative effects of a fair and adverse wind, are likewise exhibited in the third and fourth experiments with six coaches, down the Whiston plane. The velocity, which gives a resistance equal to the 96th part of the load, was 34½ miles an hour with a fair wind, and only 27¾ with an adverse wind.

When the first experiments indicating these results became public, various objections were urged against them by Mr. Brunel; and although it was not considered by Dr. Lardner, or by any of the other persons engaged in this inquiry, that such objections were entitled to any serious attention, yet it was thought advisable to make experiments which would show whether or not they had any foundation in truth. One of these objections was the following: that the circumstances under which such experiments were performed, were not really, though they were apparently, similar to those of an ordinary train in motion; that the carriages were here sent with the square end foremost, to meet and receive the full resistance due to their surface, which is totally different from the case in which the engine precedes them.* The engine in front, it was stated, would act as a sort of cut-air or bow, and thus destroy or diminish the resistance produced by the flat front of the carriages moving foremost. In order to ascertain the full value of this objection, Dr. Lardner took an engine, 'The Fury,' with her tender, and obtained two coaches, weighted so as to be nearly equal in weight to the engine and tender. The connecting rods and working-gear of the engine were detached from the driving wheels, so that the engine should be subject to no other friction save that which a coach is subject to. The Fury and its tender, and these two coaches, thus prepared, were placed successively at the summit of the Sutton plane, falling $\frac{1}{89}$ towards Manchester, on the Liverpool and Manchester Railway; and they were allowed to descend by gravity. The circumstances of their descent were found to be, in all respects, alike, passing corresponding stakes at very nearly the same time, and very nearly the same speed. The full particulars of this, and other experiments, will be published; but, in the meanwhile, the principal results of this experiment are exhibited in the following table:—

	Weight.	Total distance run.	Time of running total distance.	Greatest speed.	Time of descending the Sutton plane 1-89.
	Tons.	Yards.	m. s.	m. per h.	m. s.
Fury and Tender	11.39	4,710	11 37	29.	4 29
Two coaches	11.33	4,577	11 40	28.12	4 24
Difference	.06	133	0 3		0 5

It appears, therefore, that the difference in the whole distance run by the coaches, and by the engine and tender, amounted to only 133 yards, in a distance little short of three miles; and that there was only three seconds difference in the time. The maximum speed attained was nearly the same; and the time of descending the inclined plane only differed by five seconds. This difference, such as it was, was in favour of the coaches with their flat front. In fact, the differences of the numbers in the successive columns of the above table, are only such as would take place in the same experiment tried twice successively with the same coaches.

As a second test, the engine and tender was now placed in front of four coaches, so as to form a regular train, and it was allowed to descend the plane in the same manner. The engine and tender was then removed, and replaced by two coaches of equal weight, and the train of six coaches was then allowed to descend the plane in the same way. The result of the experiment is exhibited in the following table:—

	Weight.	Total distance run.	Time of running total distance	Initial speed.	Uniform speed on 1-177.	Speed at foot of 1-265.	Speed at foot of 1-330.	Time of moving down 1-177.	Time of moving down 1-265.	Time of moving down 1-330.
	Tons.	Yards.	m. s.	m. per h.	m. per h.	m. per h.	m. per h.	m. s.	m. s.	m. s.
Eight coaches, with pointed end foremost	40.75	14,411	26 48	23.70	24.	19.25	14.67	8 41	8 50	4 50
Same train, with flat end	40.75	14,331	25 39	23.37	26.18	19.25	14.35	7 53	9 32	4 57
Difference		80	1 9	.33	2.18		.52	0 48	0 42	0 7

It appears, therefore, that the distance run without the sharp end differed only eighty yards in a distance of about eight miles; and the other differences exhibited in the table, are evidently such only as would take place with the same experiment twice repeated with the same carriages.

With a view to ascertain how far mere magnitude of frontage, independent of the general magnitude of the train, is productive of resistance, the front of a coach was enlarged by side boards, extending on either side about 20 inches, adding about 24 square feet to the front surface, forming a sort of wings in front of the carriage, but no corresponding width being given to any other part of the carriage. The coach, thus prepared, was placed at the summit of the Sutton plane, and allowed to descend from a state of rest. It was then brought once more to the summit, and the sides removed, and it was allowed to descend with its proper front. The result of these two experiments is exhibited in the following table:—

	Weight.	Total distance run.	Time of running total distance.	Greatest velocity.	Time of descending Sutton plane 1-89.
	Tons	Yards.	m. s.	m. per h.	m. s.
Coach with pointed front	5.35	3,975	11 0	24.3	5 35
Coach with flat front	5.35	3,905	11 0	23.7	4 45
Difference		70			0 50

It is evident that no effect whatever was produced by the beak, and, consequently, the flat end of the coach produced none of that resistance which Mr. Brunel ascribed to it. The same experiment was now repeated with a train of eight coaches, down the series of inclined planes at Madeley. The beak being placed upon the first coach, the train was started from the summit of the Madeley plane, falling $\frac{1}{177}$, and it was dismissed down the series of planes already described, the circumstances of its motion being carefully observed. It was then brought back to the top of the Madeley plane, and the beak removed, and was once more dismissed, the circumstances being again observed. The following are the particulars of this experiment:—

* Mr. Brunel's Report to the Directors of the Great Western Railway Company, 27th Dec. 1838, p. 9.

	Weight.	Total distance run.	Time of running that distance.	Greatest speed.	Time of moving down Sutton plane 1-89.
	Tons.	Yards.	m. s.	m. per h.	m. s.
Coach with enlarged front	5.35	3,139	9 10	19.15	5 31
Coach with ordinary front	5.35	3,289	9 2	21.45	4 15
Difference		150	0 8	2 30	1 16

From which it was inferred, that mere width of frontage, apart from the general increase of magnitude, was not productive of any considerable practical effect in increasing the resistance.

A strong impression existed in the minds of some engineers and scientific men, to whom Dr. Lardner communicated the results of these experiments while they were in progress, that the shape of the hinder part of the train might have an effect upon the resistance. It was supposed that in very rapid motion a tendency to a vacuum would be produced behind the train, and that a corresponding atmospheric resistance, due to this partial vacuum, would be produced in front; that, consequently, if the square shape was removed from the hinder part, less resistance would be found. Although Dr. Lardner did not attach any weight to this objection, he was willing, nevertheless, to submit it to trial, and with that view he prepared a train of three carriages, which he first placed at the summit of the Sutton plane, falling $\frac{1}{89}$, and allowed them to descend by gravity in their ordinary state. He next allowed them to descend, having the pointed end behind; they next descended with the pointed end before; and, lastly, they were once more allowed to descend without the pointed end. The result of these four experiments is given in the following table:—

	Weight.	Total distance run.	Time of running total distance.	Greatest speed.	Time of moving down Sutton plane 1-89.	Time of moving 2½ miles.	Time from stake 12 to stake 28.
	Tons.	Yards.	m. s.	m. per h.	m. s.	m. s.	m. s.
Four coaches, with flat front and end	14.8	5,209	13 50	32.14	4 26	7 54	2 9
Same, with pointed end	14 8	5,350	13 45	31.03	4 25	7 50	2 9
Same, with pointed front	14.8	5,576	13 1	32.14	4 23	7 30	2 5
Same, with flat front and end	14.8	5,518	13 25	32.14	4 22	7 32	2 6

In the third column is expressed the entire distance run, in yards; in the fourth column is the time of going that distance; in the fifth column is the speed acquired in descending the Sutton plane; in the sixth column the time of descending that plane; in the seventh column the time of moving a distance of 2½ miles from the time of starting; and, in the last column, the time of moving from the twelfth to the twenty-eighth stake, throughout which, the motion being tolerably rapid, the effect of the air might be expected to be greatest. It will be evident, from this table, that the pointed end, whether before or behind, was not attended with any appreciable effect, the discrepancies being only such as would occur in the same experiment twice repeated.

It had been suggested that the resistance opposed by the air might be more or less produced by the spaces between the successive carriages of the train, the end of each successive carriage being more or less exposed to pressure against the air. In order to ascertain what weight this suggestion was entitled to, a train of eight carriages was prepared, having tenter hooks attached round the corners of their ends. Canvas was prepared, which, being hooked on these, might be stretched from carriage to carriage, so as entirely to enclose the space between the successive carriages, and to convert the whole train into one unbroken prism. The train being thus prepared with the canvas, was brought to the summit of the Madeley plane, and allowed to descend towards Crewe, the circumstances of the motion being observed as in the former experiments. It was then again removed to the summit, and, the canvas being taken off, the train was allowed to descend in its ordinary state, the spaces between the carriages being left open. The result of these two experiments is exhibited in the following table; and it will be seen that the differences are nothing more that what would arise from casual causes affecting the same experiment twice repeated:—

	Weight.	Total distance run.	Time of running total distance	Initial speed.	Uniform speed on 1-177.	Speed at foot of 1-265.	Speed at foot of 1-330.	Time of moving down 1-177.	Time of moving down 1-265.	Time of moving down 1-330.
	Tons.	Yards.	m. s.	m. per h.	m. per h.	m. per h.	m. per h.	m. s.	m. s.	m. s.
Eight coaches, with canvas ..	40.75	14,367	25 39	26.39	25.57	18.	12.4	8 2	8 47	5 31
Same wit out canvas.....	40.75	14,731	25 39	23.37	26.18	19.25	14.35	7 53	8 32	4 57
Difference		364		3.2		1.25	2.31	0 9	0 15	0 34

Being impressed with the idea that the amount of resistance might be more or less dependent on the general volume of air displaced by the train as it moves, rather than by the mere magnitude of frontage, an experiment was made which was attended with a result sufficiently remarkable. A train of five waggons was prepared, weighing exactly 30 tons, and loaded with iron rails: sides and ends were constructed, which, being put up, these waggons received the form of coaches, but which, being moveable, could be put up or laid flat upon the waggons at pleasure. This train of waggons was brought to the summit of the Madeley plane, and allowed to descend, by gravity, towards Crewe, the circumstances of its motion being observed, as before. It was then brought back to the summit of the same plane, and the sides were taken down and laid flat upon the waggons, and it was then moved down the plane. The particulars of these two experiments are exhibited in the following table:—

	Weight.	Frontage.	Total distance run.	Time of running total distance.	Uniform velocity on 1-177.	Velocity at foot of 1-265.	Time of moving down 1-177.	Time of moving down 1-265.
	Tons.	Sq. feet.	Yards.	m. s.			m. s.	m. s.
Five waggons, with high sides	30	24.	14,058	34 55	22.75	19.50	18 51	6 55
Same, without high sides	30	47.8	10,019	32 4	17.	8.50	15 44	9 47
Difference		23.8	4,039	2 51	5.75	11.	3 7	2 52

The effect of the form of the waggons upon the resistance is here sufficiently manifest, and the concurrent circumstances upon the several gradients plainly show the increased resistance produced by the increased magnitude of the train. From this and the former experiments, it may therefore be inferred that the mere form, whether of the front or hinder part, or the mere magnitude of frontage, produces no practical effects upon resistance; but that, by increasing not the frontage only, but the *whole volume* of the train, a material effect is produced.

It had been found, contrary to what was at first expected, that by increasing the number of carriages in the train, that portion of the resistance which must be ascribed to the atmosphere was increased. It appeared, at first view, that the chief, if not the only source of atmospheric resistance was to be found in the frontage or maximum transverse section. The experiments, however, are entirely incompatible with any such supposition. Had such been the case, the trains of six and eight carriages ought to have acquired a considerably greater velocity in descending the inclined planes, than the trains of four carriages, which was not the case. This is in some degree accounted for by the result of the last experiment indicating the connexion between the volume of air displaced and the resistance, and not between the mere frontage and the resistance. But, in addition to this, there is another circumstance, which was pointed out by Dr. Lardner long since. The wheels of the several carriages produce a vortex of air around them, and play in some measure the part of fanners or blowers. A considerable force must be absorbed by so great a number of these wheels moving at such a velocity. In a train of eight carriages we have thirty-two three-feet wheels, playing these parts of blowers, and revolving from four to five times in a second. How much force must be expended in maintaining such a motion, it is needless to say. But, besides this, another circumstance was observed. In these experiments, as well as in general railway practice, it is found that an extensive current of air moves beside a train, the current diminishing in velocity as the distance from the train increases. Immediately contiguous to the side of the coaches the air moves with little less velocity than the coaches themselves. Outside that is another current, moving at a less rate, and beyond that another at a further diminished rate. There is, thus, a succession of currents, one outside another, extending to a considerable distance at each side of the train. All the resistance produced by the motion of this mass of air through the atmosphere, forms part of the resistance opposed to the moving power.

In all the experiments which were made on the series of planes between Madeley and Crewe, it was found that in moving over those parts of the line which were curved, the uniform velocity was precisely the same as on those parts which were straight. There was no discoverable difference in the rate of motion, from whence it follows that curves like these, having a radius of a mile, produce no observable effect upon the resistance. The experiments were so numerous, and performed under such a variety of circumstances, that, unexpected as these results were, there can be no doubt of their truth.

It has been stated confidently in print and at public meetings, by men reputed to possess information in practical science, that the atmospheric resistance has been long known, not perhaps with perfect accuracy, but that tables, giving a near approximation, have been published by different eminent men, and are to be found in most elementary works; that calculations, founded on these tables, of the resistance of the atmosphere may be made, and that such calculations would give more correct results than such experiments as have been now described. As such statements are calculated to mislead, Dr. Lardner had no hesitation in declaring that they are utterly unfounded. No details exist, nor have any experiments ever been made by which the resistance of the air to a train of railway carriages could be obtained by any calculation whatever; nor was the amount of such resistance ever suspected, even by the persons who have ventured to utter such statements, as have been here proved to exist.

Having been satisfied of the large amount of the resistance of railway trains at the usual speed of passenger trains, the next inquiry was one of a still more difficult kind, namely, to obtain, by reducing the results of the experiments to mathematical analysis, an estimate of the quantity of this resistance which was due to friction and to the atmosphere respectively. The details of this investigation are not of a nature to introduce into a journal like the *Athenæum*. A part of them, however, may be seen by reference to the volume of the Transactions of the British Association, lately published, and the remainder will appear in Dr. Lardner's second Report. In the meanwhile we may state the results, from which it would appear, that as considerable an error has been committed in overrating the amount of resistance due to friction, as in underrating the whole resistance. The formulæ, established by Dr. Lardner, have been applied to a limited number of experiments performed under different circumstances, and the results agree in giving the friction a value amounting to

from five to six pounds a ton of the gross weight. How widely this differs from the common estimate may be perceived when it is stated, that that estimate is from nine to eleven pounds per ton. Mr. Woods, the engineer of the Liverpool and Manchester railway, has applied a method of calculation to one of M. de Pambour's experiments, by which the resistance from friction is obtained very nearly free from the effect of atmospheric resistance, but it is not the method used by Dr. Lardner. The result obtained by Mr. Woods is the same as that obtained by Dr. Lardner.

Dr. Lardner read at the meeting a communication from M. de Pambour, stating, that that gentleman had been engaged in similar inquiries, as to the amount of the friction and the atmospheric resistance, with a view to correct, in the forthcoming edition of his work on Locomotive Engines, any errors which might have existed in the former edition, and the results which M. de Pambour stated, that he obtained for the friction, were the same as those obtained by Dr. Lardner and Mr. Woods.

Dr. Lardner proceeded to say, that the results of this extensive course of experiments corroborated and fully established a doctrine which he had ventured to advance before a committee of the House of Lords in the year 1835, but which was then and subsequently pronounced to be paradoxical, absurd, and one which could have no practical truth. That doctrine was, that a railway laid down with gradients, from sixteen to twenty feet a mile, would be for all practical purposes nearly, if not altogether, as good as a railway laid down, from terminus to terminus, upon a dead level. The grounds on which he advanced this doctrine were, that a compensating effect would be produced in descending and ascending the gradients, and that a variation of speed in the train would be the whole amount of inconvenience which would ensue; that the time of performing the journey, and the expenditure of power required for it, the expense of maintaining the line of way, and supplying locomotive power, would be the same in both cases; that, therefore, he thought that no considerable capital ought to be expended in obtaining gradients lower than those just mentioned. He stated that he was assailed with the most unsparing ridicule when he advanced this doctrine, and that up to the present hour, so far as he knew, it had never been adopted or assented to by any practical man in the country. He saw, however, its complete verification and establishment in the results of these experiments, and determined on making an *experimentum crucis*, which should put its truth beyond all question. The variety of gradients on the railway extending between Liverpool and Birmingham, offered a favourable theatre for such an experiment, and accordingly a train of twelve coaches was prepared, each coach being loaded to the gross weight of five tons. An engine, called the *Hecla*, was provided, weighing twelve tons, with her tender weighing ten tons, making a gross load of eighty-two tons. It was determined to run this train from Liverpool to Birmingham and back, observing, with the utmost precision, the moment of passing each quarter-mile post, and obtaining thereby the actual speed with which every gradient, from one end to the other of the line, was ascended and descended, and the velocity on the levels. By taking a mean of the speed in ascending and descending the gradients, it would be necessary, if the doctrine held by him had any truth in it, that this mean should be exactly, or very nearly, equal to the speed on a level. The journey was accordingly performed, and the results of it will be published in detail in Dr. Lardner's second Report. But, in the meanwhile, the speed, in ascending and descending the several gradients and the mean between them, is exhibited in the following table:—

Gradient.	Speed.		Mean.
	Ascending.	Descending.	
One in	miles per h.	Miles per h.	
177	22.25	41.32	31.78
265	24.87	39.13	32.00
330	25.26	37.07	31.16
400	26.87	36.75	31.81
532	27.35	34.30	30.82
590	27.27	33.16	30.21
650	29.03	32.58	30.80
Level			30.93

He said, that on this table it is scarcely needful to make a single observation. It is quite evident, that the gradients do possess the compensating power which he ascribed to them. The discrepancy existing among the mean values of the speed, is nothing more than what may be ascribed to casual variations in the moving power. This experiment also was made under very favourable circumstances, the day being quite calm. Without going into the details of the principle on which these remarkable results depend, it may be stated generally, that since the chief part of the resistance of a railway train depends on the atmosphere, and is proportional to the square of the velocity, a very small diminution in the velocity itself produces a considerable diminution in its square. A train, in ascending a gradient, may therefore relieve itself from as much atmospheric resistance as is equal to the gravitation of the plane by slackening its speed. If its speed be slackened so as to render the resistance equal to that which it would have upon a level, then the engine would have to work with a less evaporating power than on a level, inasmuch as the motion would be slower. In practice, therefore, it can never be needful to slacken the speed so much as to equalize the resistance with that upon the level. Supposing the evaporating power to remain the same, the speed need only be slackened, so that with the same evaporation an increased resistance can be overcome at a speed less than the level, but not so much less as would render the resistance equal to the level. This, in fact, is what takes place in practice, as is apparent from the results above given.

Dr. Lardner concluded by stating in detail a number of conclusions which he considered to be warranted by the experiments; but he reserved to himself the power, when the experiments should be all reduced, of modifying these conclusions, if it should appear necessary to do so. He stated, that many of the experiments had been only recently made, and had consequently not been submitted to mathematical analysis. Meanwhile he had taken care to lay nothing before the Section, except what had been fully borne out by the experiments themselves. He regarded the following conclusions as established by his experiments:—

1. That the resistance to a railway train, other things being the same, depends on the speed.

2. That at the same speed the resistance will be in the ratio of the load, if the carriages remain unaltered.

3. That if the number of carriages be increased the resistance is increased, but not in so great a ratio as the load.

4. That, therefore, the resistance does not, as has been hitherto supposed, bear an invariable ratio to the load, and *ought not to be expressed at so much per ton.*

5. That the amount of the resistance of ordinary loads carried on railways at the ordinary speeds, more especially of passenger trains, is very much greater than engineers have hitherto supposed.

6. That a considerable, but not exactly ascertained proportion of this resistance is due to the air.

7. That the shape of the front or hind part of the train has no observable effect on the resistance.

8. That the spaces between the carriages of the train have no observable effect on the resistance.

9. That the train, with the same width of front, suffers increased resistance with the increased bulk or volume of the coaches.

10. That mathematical formulæ, deduced from the supposition that the resistance of railway trains consists of two parts, one proportional to the load, but independent of the speed, and the other proportional to the square of the speed, have been applied to a limited number of experiments, and have given results in very near accordance, but that the experiment must be further multiplied and varied before safe, exact, and general conclusions can be drawn.

11. That the amount of resistance being so much greater than has been hitherto supposed, and the resistance produced by curves of a mile radius being inappreciable, railways laid down with gradients of from sixteen to twenty feet a mile have practically but little disadvantage compared with a dead level; and that curves may be safely made with radii less than a mile; but that further experiments must be made to determine a safe minor limit for the radii of such curves, this principle being understood to be limited in its application to railways intended chiefly for rapid traffic.

In the course of his address, Dr. Lardner took occasion to acknowledge the very valuable assistance which he had received from Mr. Edward Woods, the engineer of the Liverpool and Manchester Railway, who assisted Dr. Lardner in almost all the experiments, and conducted some of them himself in Dr. Lardner's absence. To the skill and intelligence of that gentleman, as well as to his general mathematical acquirements, he felt himself much indebted. Mr. H. Earle was also associated in these experiments, and took part in the direction of many of them.

[The preceding report is necessarily much condensed, but may be relied upon as correct in all essential points. The speech of Dr. Lardner took nearly four hours in the delivery.]

Mr. C. Vignolles, C.E., said that he had listened with considerable surprise to the very unexpected results of this elaborate course of experiments; and that having frequently, on former occasions, differed from his friend Dr. Lardner on many material points connected with railway practice, he felt bound to say, on this occasion, that the results which had been attained were most satisfactory, and that they would have a most important bearing on the laying out of railways. It was evident that they would tend to relieve the engineer from the trammels under which he now conceived himself, in most cases, placed, by being compelled to adopt a section at variance with the natural character of the country; that much capital would be saved in future lines, by the engineer not being compelled to incur the same expense as heretofore in excavations and embankments and other works, into the adoption of which he was driven by the supposed advantages of very low gradients. If it be true that gradients of sixteen and twenty feet a mile are practically equivalent to a dead level, it must be equally certain, that gradients of thirty feet a mile, or even more, had not disadvantages, and were not attended with objections, even approaching in importance to those which have been usually assigned to such inclinations. Had these principles been established sooner, much capital would have been saved by shareholders in some lines of railway in process of construction. Mr. Vignolles concluded by expreseing the obligation which he was sure the engineering profession would feel to Dr. Lardner and the other gentlemen who carried out these experiments.

Mr. Scott Russell vindicated Dr. Lardner's claim to having been the first to establish the important agency of the atmosphere in resisting railway trains. He stated, that before these investigations were commenced there had been made no public statement, nor had there existed any public document by which any individual was known to have even entered on a similar investigation; that the experiments which had been made on resistance of the air by Dr. Hutton and others, were altogether inapplicable to such bodies as railway trains moving at such speeds; that Dr. Hutton himself, who had examined the question of the resistance of the air more carefully than those who went before him, admitted, that his own experiments proved nothing except our entire ignorance of either the amount or the law of atmospheric resistance, and that it was only from carefully and well-conducted experiments that any such knowledge could be expected; he therefore hoped that these experiments would be the commencement of an inquiry which would terminate in a more enlarged and correct knowledge of atmospheric resistance in general.

WEDNESDAY.

'On the Specific Gravity or Density of Steam at successive Temperatures,' by Dr. Ure.—This Report was made agreeably to a motion at Newcastle, calling on Dr. Ure, Mr. Faraday, Mr. B. Donkin, and Mr. Cooper, to draw up a view of the present state of our knowledge upon that subject. The other members of the Committee having declined to enter upon the research, Dr. Ure undertook it. He began his Report by stating that M. Gay-Lussac was the first philosopher who devised and executed an exact process for determining the specific gravity of steam and other vapours; his principle being to measure the volume of vapour furnished by a given weight of liquid. Having weighed a glass bulb, like that of a thermometer, he filled it, by heating it, and plunging the point of its capillary tube in the liquid to be

converted into vapour; repeating the heating and immersion till it was perfectly full. It was now slightly heated, to expel a drop of the liquid from the point, which was then hermetically sealed by the blowpipe. The bulb was next introduced into a graduated bell-shaped jar, about one foot long, and two inches in diameter, filled with and inverted over mercury, in a cast-iron pan. The jar was surrounded by a glass cylinder, open at each end; and the space between the two vessels was filled with oil, or water, according to the volatility of the liquid. The interstitial column of liquid rested upon the column of mercury in the iron basin or pan. This was placed over a little furnace, whereby the mercury and superjacent oil were heated to any desired pitch. Eventually the bath became hot enough to generate vapour of such tension within the bulb, as to burst the thin glass of which it was blown. In the case of water, M. Gay-Lussac continued to heat the apparatus, till the water contained between the two cylinders had entered into a state of steady ebullition; and he then measured the space occupied by the steam generated from the bulb in the bell jar, taking care to note the height of the quicksilver within the jar above its level in the basin. Deducting this height from that of the barometer in the same apartment, he found the pressure of the internal vapour. He then reduced, by calculation, the length of the mercurial column to what it would have been at the temperature of melting ice; and made a small correction for the height of the liquid column between the two cylinders. In this research, we must take care that the whole of the liquid in the bulb is reduced into vapour, otherwise we shall fall into great errors. This circumstance would occur if more liquid were introduced into the bulb than would fill the whole space over the mercury in the bell jar, at the given temperature. M. Gay-Lussac found in this way, that one cubic inch, or a gramme measure of water, produced 1,694 cubic inches, or gramme measures, of steam, at the temperature of 100 Cent. or 212° Fah., under a pressure of 29.912 inches of mercury, or that of the atmosphere in the mean state of the barometer. He reduced that volume to what it would be at 32° Fah., by the rule for estimating the expansion of gaseous matter by heat, and concluded that the specific gravity of the vapour of water was to that of air, both at the said temperature, as 0.625 to 1.000. The following table of densities includes all the vapours which he subjected to experiment upon that occasion:—

Air (at 0° Cent.) being called	1.000
Vapour of Water	0.625
Alcohol	1.613
Sulphuric Ether	2.596
Sulphuret of Carbon	2.645
Oil of Turpentine	5.013

The density of the vapour is evidently irrelative of the boiling point, or density of the liquid from which it is formed; for ether boils at 98° Fah., and has a specific gravity of 0.700 or somewhat less, while oil of turpentine boils at 316° Fah., and has a specific gravity of 0.870.

The steam which issues from the spout of a tea-kettle is no hotter, as measured by a thermometer, than the boiling liquid within, and yet, when condensed in a body of cold water or ice, it gives out as much heat as one thousand times its weight of boiling water would do. This heat of steam, which is insensible to the thermometer, is called latent heat, and it differs in quantity for different kinds of vapour. One part of water at 212° Fah. requires for its conversion into steam, as much heat as would raise 5½ parts from the freezing to the boiling temperature, or as would heat it up to 1170° Fah., could the water be made to receive that heat without changing its form. The quantity or energy of heat which steam contains or possesses is constant; that is, for equal weights, steam of every temperature and density contains the like quantity of heat;—a proposition which has been proved by accurate researches. Water at all temperatures, even in the state of ice, is convertible into vapour: the density of this vapour depends upon its temperature; so that this density, that is, the weight of the steam under a given volume, is greater the higher the temperature at which the steam is generated over water. When the steam is not in contact with water, it follows the same law of expansion with heat, as gases do. An air-tight boiler having a vacant space over the water of about 1,700 cubic inches, contains at the temperature of 212°, one cubic inch of water in the state of vapour, and has therefore a specific gravity of 0.000589; water being 1.000000; $=\frac{1.000000}{1700}$. If the heat be raised to 234.5°, the incumbent steam will acquire an elastic force equal to 45½ inches of mercury, or 22.3 lb. upon the square inch, and a density of 0.000867; if to 250.2°, the elastic force will be 59.8 inches of mercury, or 29.26 pounds, and the density will be 0.001114. In the former case, the elasticity has increased about 50 per cent., and the density 34.3; in the latter case the elasticity has increased another 50 per cent., and the density 32.1; thus, while the elastic force is doubled, the density is increased in the proportion of 1114 to 589 or 100 to 53. We see, therefore, that the elasticity of steam increases with the density, but in a greater proportion, or more rapid ratio. Since like weights of steam contain like quantities of heat, and since the elastic force of steam is the moving power in steam-engines, it follows, that for like quantities of heat, or fuel well applied, a greater effect will be obtained from steam of high temperature and density, than from steam of lower temperature and density. At all temperatures, the sum of the latent and sensible heats of steam is a constant quantity, so that steam of higher density and temperature contains always the same quantity of heat, as steam of lower density and temperature. When denser steam flows into a vacuous space, it will fill it entirely without condensation, provided that no heat is dissipated outwards; and it will possess an elasticity and temperature dependent upon its expansion. Suppose, for example, that a vessel of one cubic foot capacity is filled with steam of 212° F., let this vessel be placed in communication with another air-tight vessel, of nine cubic feet capacity, so as to expand into it; in filling the latter, it will become expanded into ten times its bulk, and from the table which accompanies the report, it will be found to assume, when thus expanded, a temperature of 108.5° F., while its elasticity falls to 2.4 inches of mercury; though the steam has neither absorbed nor emitted any heat, nor deposited any water by condensation. When dense steam escapes into the air, it assumes the same specific gravity and elasticity as the atmospheric vapour.

The table annexed contained seven columns; the first three were the scales of the three thermometers now in use; and Dr. Ure remarked, that it was to be regretted, that we in Great Britain do not adopt the Centigrade scale, as the Germans are now doing, instead of the arbitrary and inconvenient divisions of Fahrenheit. The fourth and fifth columns exhibited the elastic forces of the steam, the former in inches of mercury, the latter in pounds upon the square inch. The sixth column showed the number of cubic feet of steam resulting from one pound of water, and the seventh the specific gravity of the steam, water being called unity, or 1.000000.

Tuesday Evening.—There was a promenade in the Town Hall, which was numerously attended, and the company were unexpectedly gratified by the presence of the Chevalier Neukomm, and his performance on the organ.

MEETING OF THE GENERAL COMMITTEE.

THURSDAY.

The Rev. W. V. Harcourt, President, in the chair.

Letters of invitation were read from Glasgow, Hull, and York, and personal applications for an early visit of the Association were made by delegates from Manchester and Devonport. It was unanimously resolved, that the next meeting should be held at Glasgow, in September, and, in deference to the strong opinions entertained by the Scotch generally on the impropriety of Sunday travelling, that the meeting should commence in the middle of the week, viz. on Thursday, the 17th of September, and that the General Committee should assemble on the preceding day. The following noblemen and gentlemen were chosen as officers of the Association for the next meeting:—The Marquis of Bredalbane, *President*; Dr. M'Farlane, Principal of the Glasgow University, Lord Greenock, Sir T. M. Brisbane, Sir D. Brewster, *Vice Presidents*; L. P. Nicholl, L.L.D., A. Little, Esq., J. Strang, Esq., *Secretaries*; C. Forbes, Esq., *Treasurer*.

The Dean of Ely regretted that, in consequence of increasing business, he was under the necessity of resigning his office as one of the General Secretaries. —Mr. Murchison, in accordance with what he had announced last year, tendered his resignation, but, at the unanimous request of the Council and the General Committee, consented to hold office another year. —Major Sabine was elected in the room of the Dean of Ely.

SATURDAY.

In the absence, from illness, of the Rev. W. V. Harcourt, the Marquis of Northampton took the chair. Mr. J. Taylor, the Treasurer, then made his Report, from which it appeared, that the number of tickets issued to—

Annual subscribers before the commencement of the meeting, was	367
Tickets to annual subscribers during the meeting	737
Tickets to old life members	280
Tickets to foreigners	34
Total number of tickets issued at Birmingham	1,438

The proportion of new to old annual subscribers was not stated, and, on inquiry, it appeared that no data existed for ascertaining the relative numbers.

The receipts before the meeting were	£ 425
During the meeting, including compositions from 73 new life members	1033
Four compositions for books, pursuant to new laws	20
Amount of books sold	73
	£1553

Until the termination of the Meeting, the precise balance cannot be ascertained; but the permanent property of the Society consists of 5,500*l.* in the 3*l.* per cent. consols., and a stock of books valued at 1,094*l.* 10*s.*

The Dean of Ely (the Rev. G. Peacock) read an account of the application made to Government, by a deputation from the Association, for the erection of Magnetic Observatories, and the sending out the Antarctic Expedition. He then took occasion to dwell very strongly on the unabated zeal of Sir J. Herschel in favour of the interests of the Association. He also reported, that Her Majesty's Government had established a depository for the collection and preservation of mining records, and had connected with it a museum of Economic Geology; and he further stated, that the application to have the coal districts copied from the maps of the Ordnance Survey, and engraved on a much larger scale, had been favourably entertained, and was supported by Col. Colby. He noticed, that the Philosophical Societies of Manchester and the West Riding of Yorkshire had petitioned Parliament on the subject, and recommended a scale of six inches to a mile; but he added, that the Council advised the Association not to press for too hasty a decision.

Thanks were voted to the inhabitants of Birmingham, for their kind reception, to the Philosophical and other Societies, to the directors of the Grand Junction, and the Liverpool and Manchester Railways, for the facilities they had afforded to the Committees appointed to conduct railway inquiries.

The grants of money shggested by the Committee of Recommendations were then read *seriatim*, and passed without opposition. They were:—

Section A.—Mathematics and Physics.

For the reduction of meteorological observations made by and under the direction of Sir J. Herschel	£100 0 0
*For the reduction of Lacaille's catalogue of stars	189 0 0
*For the revision of nomenclature of stars	50 0 0
*For the reduction of stars in Lalande's Histoire Céleste	328 1 6
*Completing, &c. the catalogue of the Royal Astronomical Society	343 3 6
To purchase meteorological and magnetic instruments for simultaneous observations in the new magnetic observatories*	400 0 0
For hourly meteorological observations at two stations in Scotland	50 12 4
To continue observations on waves	30 0 0
Ditto ..subterranean temperature	20 0 6
Ditto ..tides	50 0 0
For preparing forms to tabulate observations by curves	10 0 0
To a Committee for superintending the translation and publication of foreign scientific memoirs	100 0 0
Observation of Whewell's anemometer at Plymouth	10 0 6
Ditto Osler's Ditto	30 0 0
Hourly meteorological observations at Ditto	40 0 0
Erecting one of Osler's anemometers in Scotland	60 0 0
Total grants to Section A	£1810 17 4

* It was stated, that, from the liberality evinced by Her Majesty's government and the Hon. East India Company, this grant was not likely to be claimed, but that the Committee wished to retain the power of ordering the instruments, to save time and prevent delays.

Section B.—Chemistry.

For the analysis of atmospheric air	£24
Experiments on the action of sea-water on wrought and cast iron	30
Ditto—effect of boiling water on organic and inorganic bodies	7
Ditto—specific gravity of gases	40
For the continuation of Professor Schönbein's experiments on the connexion between chemical and electrical phenomena	40
Total grants to section B....	£141

Section C.—Geology.

*For continuing the researches respecting the fossil reptiles of Great Britain	£81 17

Section D.—Zoology and Botany.

For experiments on the preservation of animal and vegetable substances	£ 6
For drawings of the radiata	50
For researches with the dredge into the natural history of marine animals and fossils of the Pleiocene period	60
For engraving skeleton maps on which to mark the geographical distribution of plants and animals	20
For printing questions calculated to guide travellers in their researches into the different races of men, particularly such as are uncivilized	5
Total grants to Section D	£ 141

Section E.—Anatomy and Medicine.

Experiments on the sounds of the heart	£25
Physiology of the lungs and bronchiæ	25
Construction of medico-acoustic instruments	25
Inquiry into the connexion between the veins and absorbents	25
Experiments on acid poisons	25
Total grants to Section E	£125

Section F.—Statistics.

Statistical inquiries into the schools of England, and the condition of the working classes	£100

Section G.—Mechanical Science.

Inquiries into the duty, &c. of American steam-boats	£ 50
Duty of engines not in Cornwall	20
The relative merits of iron made by the hot and cold blast	100
The deflection of beams variously loaded	20
To continue experiments on the form of vessels	200
Total grants to Section G	£390
Total of grants recommended	£2789 14 7

Recommendations not involving grants of money:

The Council invited the Sectional Committees to call for reports on the progress of the several sciences.

Section A.

It was recommended, that Mr. Henwood should be requested to continue his researches on the temperature of mines in Cornwall—Mr. Fox his researches on subterranean temperature—Prof. Miller his researches on crystallography—Prof. Powell his experiments on radiant heat—And that the various gentlemen at home and abroad engaged in the investigation of electro-magnetism and electro-chemistry should communicate the result of their researches and experiments to the Association.

Section B.

It was recommended, that Mr. Clarke should be invited to publish his paper (see Report) without abridgment.

Section C.

It was recommended, that application should be made to the Trustees of the British Museum, to have the shells in that Institution so arranged as to illustrate the diversities of size, growth, &c., and to facilitate comparison of the actually existing shells with fossil remains and impressions on rocks—That a Committee be appointed to continue the arrangements for the collection and preservation of mining records.

The Committee then adjourned to Sept. 16, 1840.

* The grants to which asterisks are prefixed are merely continuation grants.

WILLIAM WILKINS, M.A. F.R.S.

It is our painful duty to record the death of the Professor of Architecture of the Royal Academy, who died at his house, near Cambridge, on Saturday last, in the 61st year of his age.

Mr. Wilkins entered the University as a scholar of Caius and Gonville Colleges, in 1796, and graduated in 1800, as sixth wrangler of his year. In 1801, he succeeded to the University travelling Batchelorship, and passed four years in Greece and Italy, in the prosecution of his studies amongst the remains of ancient art, preparatory to commencing his profession of an architect, and during which time he was elected a Fellow of his College. His classical taste in designing public buildings was very soon appreciated, for, in competition, he won the palm, at an early period of his career, by his designs for the East India College at Haileybury, and Downing College at Cambridge. Of his public buildings, the Cambridge University Club-House, St. George's Hospital, the London University, and the National Gallery, in London; his Colleges of Corpus Christi, Downing, and his additions to Trinity and King's, at Cambridge; his national monuments at Dublin and Yarmouth—all bespeak taste and genius; and, although the opinions as to the degree of merit to which these may be thought entitled are various, yet, now that he is no more, hyper-criticism must be silent, and every allowance must be made, in respect of which so many are oblivious, for that dissimilarity of taste, and that dissonance of feeling, which characterize bodies of men with whom the appointment of architect so frequently rests; for, to those conversant with such things it is well known and admitted, how often the taste and spirit of a design is crippled and injured by the overruling ordinances of those who will not give scope to the aim and imagination of the designer.

Perhaps of all his public buildings, none was so generally admired and approved of, and none upon which he prided himself more, than the College of Corpus Christi (in the chapel of which his remains are interred). It was in this work that he was left to the full scope of his genius, without restraint, his employers resting wholly upon the responsibility of his professional character. The same may be very nearly said of King's; and whoever was acquainted with the previous buildings, and the *only data* upon which he could work at Trinity, will appreciate his ingenuity in producing such a building as the King's Court out of such difficult and heterogeneous limitations. Of his works of literature, his 'Magna Græcia,' his translation of Vitruvius, and his editorial labours upon the works of the Dilettanti Society, place him amongst the most accomplished scholars of the architectural school; whilst his restoration of the mutilated Greek inscriptions relating to the public edifices of Athens, bear ample testimony to the depth and extent of his scholarship. He was a great and ardent lover of the arts, which he encouraged to the extent of his means. In all the relations of private life, he was most amiable; and these combined high qualities of his head and heart obtained for him the friendship and sincere attachment of men in the highest walks of literature and fame. We, who have seen many of his designs for public works, some of which were selected for execution by the government, but afterwards abandoned for want of means to complete them, know, that had they been executed, his fame as an architect would have been more highly appreciated; but, from those which exist, sufficient testimony may be drawn to exemplify a strong and vigorous mind, and an exceedingly high, correct, and polished taste.

OUR WEEKLY GOSSIP.

The Birmingham Session of the British Association closed its peaceful labours on Saturday, and the many distinguished persons who had there met in furtherance of one common object—the advancement of science, and the good of all mankind—are already scattered far and wide, not less content, we hope, with the result of their labours, because a leading political journal has been pleased to pour out on them its vials of wrath and scorn,—how justly, our readers can now determine. A report was, it appears, sent to the newspaper in question, which it did not think worth publishing. In that decision, judging from what appeared in the other daily papers, we concur; but it does not follow that the proceedings themselves were as valueless as that report. The truth is, that the political journals have legitimately nothing to do with the Association; and had Parliament been sitting, they would not, any one of them in all probability, have devoted to the subject more than a few paragraphs. It must be further understood, that the reports to which we allude are not written down, like the debates in Parliament, by a legion of competent men accustomed to the duty, but are manufactured on speculation by persons who attend the meeting, as others, or the same, attend horse races and inquests. These persons compile the best accounts they can on subjects they do not understand—accounts often absurd from their errors, and ridiculous from their omissions,—the whole proceedings of an important Section being frequently dismissed with a list of papers read, copied from the notice affixed to the doors of the meeting-rooms; and these accounts are sent to the daily papers, to be paid for if inserted. To form a judgment from such reports seems to us rather a hasty proceeding; but we could not but smile when we saw among the important and valuable "matters of more general interest," whole columns devoted to a full, true, and particular account of the Eglintoun Tournament! Seriously, let any unprejudiced and competent person read attentively the reports as published in this journal, and say whether the censure was justified. But the benefits which result to science from the Association, are not limited to the papers read at its meetings. There are many important researches carried on at its expense, which could not be perfected by individual exertion—many which require a vast field of observation and a concerted system of operation;—money, too, has been liberally voted for reducing observations which have remained for years, and must have remained for ever, utterly valueless, but for the Association;—indeed, to form a general estimate of the vast field of its usefulness, it is only necessary to look over an account of the sums of money which have been, from year to year, voted in furtherance of such objects. These, however, are mere hints for reflection. A few words now on a subject in reference to ourselves. The *Birmingham Journal*, in a leading article, has directed the attention of its readers to what it considers the unfair partiality shown in favour of the *Athenæum*; but this is done in so liberal and temperate a manner, that we feel bound to offer a few words of explanation. The writer states, that with only one or two exceptions, "the application of the Reporters connected with the political press, for access to papers, was met with a refusal. The eloquent discourse,—for most eloquent we are informed it was,—of the reverend and learned President, was also declined,' and the excuse was, that the papers in question were reserved for the *Athenæum*. * * We have no wish to undervalue that journal when we say that the local newspapers had a claim quite as strong as it could put forth." Now, we submit that the writer has not taken all circumstances into consideration. The necessity for a full and correct record of the proceedings is obvious; would any local paper undertake to publish such a report, even if the same facilities were offered which are given to those gentlemen who, in the different Sections, compile the Reports for this journal? We think not. The exclusion of all matters of local and political interest, of all advertisements, would be unavoidable, and for weeks together; the paper indeed must, for the time, wholly change its character, and this, too, with a devoted zeal in the cause, which is scarcely to be anticipated; for as to the "harvest" it would reap, and to which our contemporary alludes, we can assure him that we never sold as many extra copies of any Report of the Association as would pay for the mere postage of letters and porterage of parcels. In a large sense, indeed, we agree that a literary journal finds its interest in doing perfectly whatever comes legitimately within its province,—and on this principle the *Athenæum* is conducted. Again; is it better that persons requiring information as to past proceedings should send to Newcastle, Dublin, Liverpool, York, Bristol, Birmingham, and wherever the Association may have met, in the hopeless chance of hunting up old newspapers, or refer at once to a journal, where all like records are to be found, and which the majority of those interested have on their library shelves?

We read with regret, in the French papers, that Lafont, the celebrated violinist, was killed, on the 23rd of August, by a fall from the roof of a diligence as he was travelling with Herz, the pianist, to Bagneres-en-Bigorre.

The Chevalier de Klenze, of Munich, lately visited St. Petersburgh, by desire of the Emperor, to submit designs for a new Museum for Sculpture and Pictures. One has been approved, and the structure will probably be the most magnificent in Europe. It is to be attached to the Hermitage Palace, the back buildings of which are to be pulled down to make way for the new pile. The entrance will be very striking, the giant figures of the Temple of Jupiter, at Agrigentum, in Sicily, having suggested its most prominent decoration. A superb staircase, with noble colonnades of marble or granite on each side, will lead to the upper range of galleries for the paintings, and, in fact, no expense will be spared in order to make this museum exceed in splendour those of Berlin, Munich, or Paris: the choice of the architect is a sufficient guarantee for the character of the archi-

tecture. De Klenze is also, we understand, to be charged with the completion and decoration of the interior of the immense church of St. Isaac; the third, in point of size, of European cathedrals. It is said that the Imperial family have been obliged to abandon the Winter Palace, recently built in place of the one burned down about two years since, in consequence of the quantity of vermin with which it swarmed, and which are supposed to have been produced from the timber used in its construction.

DIORAMA, REGENT'S PARK.

This Establishment will be SHORTLY CLOSED for the Season.—The Pictures now exhibiting represent the CORONATION of HER MAJESTY QUEEN VICTORIA, in Westminster Abbey, and the INTERIOR of the CHURCH of SANTA CROCE, at Florence, with all the effects of Light and Shade from Noon till Midnight. Both Paintings are by LE CHEVALIER BOUTON.—Open from Ten till Five.

ROYAL GALLERY OF PRACTICAL SCIENCE,
ADELAIDE STREET, WEST STRAND.

A Musical Performance on Reisner's improved Accordion, by Vital Reisner, aged 11, principal player on the Instrument at Paris, takes place daily; Polarization of Light by Mr. Goddard's Polariscope; the only living specimen of the celebrated Electric Eel ever brought to this country; the Invisible Girl, Steam Gun, Oxy-hydrogen Microscope, Chemical, Electrical, and Optical Illustrations, &c.—Open daily at Ten A.M. Admittance, 1*s.*

THAMES TUNNEL,

OPEN to the Public every Day (except Sunday), from Nine in the Morning until Dark.—Admittance, 1*s.* each. The Entrance is near the Church at Rotherhithe, on the Surrey side of the River. The Tunnel is brilliantly lighted with gas, and is now completed to low-water mark on the Middlesex shore.

Thames Tunnel Office, By order,
Walbrook Buildings, Walbrook, J. CHARLIER.
31st August, 1839. Clerk to the Company.

MUSIC AND THE DRAMA

WE cannot withhold a word of congratulation on the return, from America, of so charming and graceful an actress as Miss Ellen Tree: she is the more welcome back to the English stage, for that her feminine sweetness and gentleness of manner are a grateful repose after the hurricane of rant into which "the tempest and whirlwind of passion" has of late degenerated. She was greeted by an audience that overflowed the HAYMARKET, on Tuesday, with a degree of enthusiasm that proved she had not been forgotten during her absence, and which almost overpowered her. She played *Viola*, in 'Twelfth Night,' with only too timid and constrained delicacy; deporting herself rather as a modest young page, who admired *Olivia*, than with the saucy airs and raillery of a secret rival in the *Duke's* affections. This was not the only false reading in the performance, however; nor the most conspicuous: indeed, as regards the acting, it was altogether a 'Comedy of Errors'—if the term can be applied to anything so farcical as the humorous portion of it: Farren's *Malvolio* was a grievous miscarriage in so clever a comedian. In the afterpiece—'The Ransom'—Miss E. Tree was more completely at home.

This day, fcp. 8vo. 6*s.* the Second and concluding Vol. of LIVES of EMINENT LITERARY and SCIENTIFIC MEN of FRANCE. By Mrs. SHELLEY, &c. &c. Being Vol. 117 of Lardner's Cyclopædia.

*** A detailed Catalogue of the entire Contents of the Cabinet Cyclopædia, from its commencement in 1829 to its completion in March 1841, may be had *gratis*.

London: Longman, Orme, & Co.; and John Taylor.

NEW PEERS.—Just published,

DEBRETT'S COMPLETE PEERAGE of the UNITED KINGDOM. Improved by WILLIAM COURTHOPE, Esq. The *Twenty-second* Edition, including the *New Peers* created at and since the Coronation; with a Portrait of *Her Majesty*, beautifully engraved by Bean; and the Arms (now incorporated with the Text) from Designs by Harvey. In one volume, price 28*s.* in extra cloth.

J. G. F. & J. Rivington; and other Proprietors.

THE NEW NOVEL.
Now ready at all the Libraries, in 3 vols.

MORTON OF MORTON'S HOPE.
AN AUTOBIOGRAPHY.

"A work of great talent, variety, spirit, thought, and originality."—*Literary Gazette*.

"These volumes display considerable talent."—*Spectator*.

"An extremely clever work; written with great force and spirit."—*Atlas*.

"A work extremely well written. The author is happy at the ludicrous, and acute in satirical scenes, whilst in pathos he takes a high stand amongst our best writers of imagination."—*Dispatch*.

Henry Colburn, Publisher, 13, Great Marlborough-street.

THOMAS CARLYLE'S WORKS.

Just published, the Second Edition, in 3 vols. 12mo. price 1*l.* 5*s.* cloth and lettered,

THE FRENCH REVOLUTION. A History.

Vol. I.—THE BASTILLE. Vol. II.—THE CONSTITUTION.
Vol. III.—THE GUILLOTINE.

Just published, in 4 vols. crown 8vo. price 2*l.* 2*s.* cloth and lettered,

Critical and Miscellaneous Essays.

In the press, a New Edition, revised, in 3 vols. 12mo. cloth and lettered,

Translation of Goethe's Wilhelm Meister; containing Meister's Apprenticeship and Meister's Travels.

James Fraser, London.

[ADVERTISEMENT.]

JACKSON ON WOOD ENGRAVING.

"Seest thou a man wise in his own conceit? there is more hope of a fool than of him."—PROVERBS, chap. xxvi. v. 12.

To the Editor of the Athenæum.

SIR,—As you have thought it necessary to notice W. A. Chatto's insinuation of corrupt motives, in the exercise of your office as a reviewer, I trust you will be so good as to allow me sufficient space, at your earliest convenience, for refuting that person's more direct and truly slanderous attack upon myself, in his unaccountable 'Third Preface,' &c.

This letter is extorted from me in defence of that character which I have never done anything to degrade, and most certainly nothing in connexion with this somewhat arduous and very expensive undertaking. Now, I fairly ask, if I had wished to deny those services, labours, &c. &c., for which I paid Mr. Chatto most liberally, should I have been so willing (as I always was) that a separate preface, signed by himself, should satisfy his vanity, as my money had (or ought to have) satisfied his pocket? to define our several exertions farther was impossible; it was a work to be jointly produced by a good practical man, and a supposed good and competent man of letters. I am not afraid to stand upon my reputation as an artist as to my qualifications for what I undertook. He is candid enough to allow that, as "a working wood-engraver," I "necessarily know something of" my "art"!!! In one place he complains that I have suppressed his "labours"; at other times made too free with his "name"! Who, I pray, has ever heard of it? His mention of Mr. Knight's name in connexion with mine, can only be accounted for by supposing that, in this case too, he has "been deceived by appearances." As no one but myself ever attempted to strike out a single word, I shall repeat what Bewick said. With the "weaving of words" I did not interfere, but took the liberty of striking out whatever I knew not to be true. Mr. Knight had nothing whatever to do with it. As for the remuneration for "services," which it is true I always considered to be respectably performed, but nothing more, (whilst nothing more was required,) I leave it for any one at all conversant with such matters,—nay, to the public at large,—whether ONE HUNDRED AND EIGHTY-EIGHT POUNDS! the sum W. A. Chatto admits to have received from me, be not most ample, taking into consideration my own labour, and payment to assistants, printing, paper, &c. &c. Now, the credit of the enterprise is not only my own, but the original project also, which even his own preface will go hard to prove. He says:—"It is but justice to Mr. Jackson to add, that the work was commenced by him at his sole risk; that most of the subjects are of his selection; and that nearly all of them were engraved, and that a great part of the work was written, before he thought of applying to a publisher." The credit of commencing the work, and of illustrating it so profusely, regardless of expense, is unquestionably due to him"! When W. A. Chatto first agreed to *write* the work for me, he undertook to do it for Eighty Pounds, and to complete it in about twenty, or twenty-five sheets. If he really (as he says) undertook it as early as "June 1834," we shall see how well he performed his part. On the 6th of July, 1835, he called upon me for five pounds!—On the 7th or 8th of the same month, five pounds more!—On the 30th of the same month, ten pounds!—On the 28th of August, ten pounds!—On the 26th of October, ten pounds!—On the 24th of December, ten pounds!—" Hard pounding, gentlemen."* W. A. Chatto has quoted a letter of mine, without date, which he says was "written in January 1836." If he has printed it correctly, it would appear that it has been written on a "Tuesday morning." As January 1836 began on a Friday, there could be but one "Tuesday" before the 6th. On that day he called upon me for ten pounds more! I am willing, therefore, to give him this benefit, and to suppose that this letter was written on "Tuesday" preceding the 6th. It appears then, from his own showing, that I had paid him Fifty Pounds (not including the ten pounds paid on the 6th) before he had produced a single sheet of manuscript; and that nearly two years had passed away before he had done so! On the 6th of January, 1836, as I have already stated, I paid him ten pounds! on the 19th of February ten pounds! and, within a few weeks, I paid ten pounds more! when I thought I had paid him all. I was, however, mistaken. In May, 1836, he made another call. At this time the work had been extended "beyond what I had originally contemplated," or he either, if he in reality ever intended to make his "word his bond"! I was now in a cloven stick, and had no alternative but to lose all I had paid, or pay more! In a word, I was obliged to consent to pay four pounds per sheet for every sheet above twenty!—W. A. Chatto being willing, at that time, to wait till publication. Listen to what he says in a letter to me on the 14th of this very month (May 1838), respecting the "working wood-engraver." He is advising me respecting some information a gentleman wanted for an article on wood engraving. "I think that you might have been content to allow your merits and discoveries to rest with me to do them justice—no pouncing, mercenary, ephemeral acquaintance can appreciate them as I do—and not, in the first instance, have communicated with an absolute stranger on a subject which I think ought to have been left entirely with me. I stand upon your own merits: Truth is great, and will prevail." I have said that he was to wait "till publication." He did not. In the autumn of 1838 he applied for Twenty pounds. Having nothing in black and white to show, I saw no escaping another "pounding," therefore promised to pay the money in a week. I went to it to-day, consequently received a letter from him, making it quite impossible for me to treat with him any longer without the presence of a third party. I called in my "particular friend" through whom he promised to meet me at my own house, on the evening of the 18th of October, 1838. The subject was gone into, and after W. A. Chatto had folded up his papers to leave the house, more than once, he threatened to sell all his books next day, and to publish the book in a cheap form,—without the Cuts!—(the part of Hamlet "omitted" for that night only,—no money to be returned! "This was the unkindest cut of all")—and leave me to make the best of it, if he did not "get twenty pounds by Saturday." By about two o'clock in the morning we had got so far, that W. A. Chatto had written out an agreement himself, and I had signed it; he was doing this when my "particular friend" smiled at a remark he then made, when he immediately tore the agreement in pieces, seeing in his error, promised to write it out again on the 19th. This was done, and eventually signed by all parties. I sent him the twenty pounds on the following day. On the 5th of December he called with the Preface, which did not meet with my approbation. On the 6th he called upon me by appointment; refused to make any alteration, and otherwise so conducted himself, that the interview terminated by his departing with the Preface in his pocket, at the same time using such language as determined me to have no further personal communication with him. He then appealed to the publisher, and left with them what he called "The Preface." This was, however, not the same, as an authenticated copy of the first, in my possession, will prove. I must now return to the period (January 1836) when he says he "allowed the whole of the first two chapters, * * together with a great portion of" his "materials and prospectus of the work, to be shown to" Mr. Knight. Mr. Knight read this manuscript, arranged with me in February, and announced the book in his Catalogue, in the *Literary Gazette*, of the 26th of November, 1836, page 768, as also in the *Spectator* of the following day.† I repeat, Mr. Knight read the manuscript, and was perfectly justified in advertising it as he then did, and why? simply because he read in this said manuscript the following passages, which are also in the "proof sheets" now in my possession, but which were struck out by the very man who now has the "hardihood" to refer to them, and that too after he had pocketed the sum for which he originally agreed, as well as after the above advertisements had appeared,—that is to say, after the 25th of January, 1837, as I find the first "proof sheet" is dated on that day. I shall first quote two passages that still stand in the book, page 87:—"A wood engraver—on this point I speak from experience—would be much more likely to commit literal errors," &c. Page 105:—"Of the possibility of cutting moveable types of a certain size in wood, and of printing a book with them, I am convinced from experiment," &c. The following passages are in the "proof sheets," page 69:—"The manner in which they are engraved—I may venture to give an opinion respecting the practice of my own art—is that which," &c. The passage in Italics has been struck out! page 108, "*Having cut many hundred engravings on wood, and paid some attention to the subject of surface printing, I trust that I shall not be accused of egregious self-conceit if I prefer the result of my own examination.*" &c. The last paragraph has been struck out entirely. If William Andrew Chatto wrote all this himself, what was his motive for doing so? If he did not, what was his motive for striking it out? Whilst I leave the public to judge for themselves, I shall make an extract from the manuscript as originally sent to me, immediately after he (W. A. Chatto) thought he had succeeded in destroying the identity of the person, by striking out such passages. "The preceding fac-simile, which, so far as regards mere mechanical execution, is at least equal to the original, was engraved by a pupil of Mr. Jackson's, who had just entered in the second year of his noviciate." Here is a complete transposition of the person! The manuscript containing this was sent to me with a note from the writer, and which note is dated "Friday Evening, 11th May," [1838]. On the following day I wrote him a note, after reading the manuscript, from which the following is an extract:—"I have read that part of the MS. you directed my attention to, and find it quite correct," &c. "I can have no sinister motive for suggesting that you omit my name as introduced in that sentence. Engraved by a pupil, will read just as well, and I would like it better, as it will not appear as if we were parting company," &c. The manuscript was altered accordingly, and it now stands in the book (page 45*a*) thus:—"was engraved by a boy who had just entered in the second year of his noviciate"! Had the person who could blot out an important feeler like this, "no control"? I never parted with the control of the work; if I had, how does it happen that he writes to me in the following manner? "I have corrected the passage *and if White,' according to your pencil mark on the proof, although the original is exactly copied from what you have stated in the MSS." This relates to the historical portion of the work, and certainly proves anything but having received his information from me "verbally." Again:—"I am glad that you received the information respecting the two engravings ** in time to correct the error," &c. As a specimen of his "ignorance," take the following extract from a note written to me. "Please to refer to your copy of Kirkall's chiaro-scuro—Eneas carrying away his father—and decide whether the outlines are by the aquatint or mezzotint." Do people ask such questions when they can decide for themselves? While residing at Teddington, I received a letter, per post, dated "July 26, 1838," from which the following is an extract:—"I have also a proof of a second sheet, received yesterday, and before it can be finally corrected, I wish you to accompany me to the Museum to see some chiaro-scuros," &c. This was to examine Herbert Goltzius's portraits of the Roman Emperors, and the object in doing so, was to decide whether the outlines were printed from an etched plate, or from wood.—Papillon having stated that they were from the former. W. A. Chatto could not distinguish between copper and wood, or he would never have brought me from the country on purpose to do so. I found not merely the outlines printed from copper, but that the field of the medal—printed in a kind of sepia—was also from metal, mounted on blocks of wood. After this, W. A. Chatto wrote a description of these medals, which was inserted in the "proof sheet," and now occupies nearly the whole of pages 483 and 4. Hear what he says:—"What Papillon says about the outlines being etched is true; but a close inspection of those portraits will afford any person acquainted with the process ample proof of the 'rentres' being also printed from plates of metal"! &c. Now, as W. A. Chatto could neither decide upon the one, nor discover the other, would it be unfair to say, that he does not know an etching from a wood-cut? I have not yet done. After leaving the Museum I returned to Teddington, leaving him to insert this description: he did so, and at page 484 we have the following:—"And about 1722, Edward Kirkall engraved the outlines of his chiaro-scuros in aquatint"!!! This I have been obliged to contradict in the "errata," and, together with the note I have already quoted, shows pretty plainly what would have been the result of his boasted "authorship," without some one else constantly at his elbow! I think that I have said enough to justify the fact that the work ought to be called by my name. What other arrangement I might have agreed to, if he had not shown himself so very quarrelsome and ungrateful, is quite another matter; although it is a positive fact, that, up to October last, he constantly expressed himself unwilling to allow his name to appear, lest he should seem to be letting himself down as a mere hireling author! W. A. Chatto has informed the public of an action which I have against him, but he has forgotten to add that I have another also pending (or rather only the more important of the two) for a sum of money, which, thinking him to be a very different man to what he has thought fit to show himself, I had entrusted him,—namely, Seventy-three pounds and ten shillings, in my capacity as a "working wood-engraver."

The following extract, from the letter of a friend, whilst pointing out the motives for my silence in the first instance, would, of itself, form no inconsiderable answer to my calumniator. "You will now, I hope, be at ease; his great gun has gone off, and, I think, has not even made much noise. The man is violent and abusive, but his violence prevents his abuse from being effective. It is also nearly all assertion, and these assertions are sometimes inconsistent,—as that the project was yours (p. vii. preface), and that it was his own (page 5). He also proves too much for his own case. If the project was his,—if the illustrations were not yours.—if you had never seen an old print, and had never attempted to amuse or instruct yourself by studying the subject,—what inducement, or what interest, could you have had in bringing out a work, (to which, as he asserts, his name was to be prefixed,) 'regardless of expense' in the illustrations, and at the same time paying him the very 'inadequate sum' of (I forget how much, but above) 150*l.*? Everybody will see and feel either that he agreed to sell the 'peacock's feathers,' and having pocketed the cash, now reclaims them; or that the case is as you state it. The first looks so much like a lie, that few will believe it, even though it is disgraceful to himself; and you will certainly suffer more from professional feelings than from the opinion of the world, which, I am sure, will decide in your favour."

I remain, Sir, your obedient servant,
JOHN JACKSON.

12, Cardington-street, Hampstead-road,
27th of August, 1839.

* See Literary Gazette, August 10, 1839, page 506.

† Since the above was written, I have ascertained that the work was first announced in May 1836.

NEW AND ENLARGED EDITION, INCLUDING A LIFE OF WATT.

On the 1st of October will be published, No. I. price 1s. (to be continued Monthly), of

THE STEAM-ENGINE

FAMILIARLY EXPLAINED AND ILLUSTRATED,

With an Account of its Invention and Progressive Improvement; its application to Navigation and Railways, with plain Maxims for the guidance of Railway Shareholders;

COPIOUSLY ILLUSTRATED WITH ENGRAVINGS ON WOOD.

By Dr. LARDNER.

TO BE COMPLETED IN TWELVE MONTHLY NUMBERS, AT 1s.

**** The work now proposed will be the Seventh Edition of Dr. LARDNER'S work on the Steam-Engine, already before the public, but so extended and enlarged as to form in effect a new Treatise. This change has been required by the great improvements which have been introduced in the applications of Steam power, more especially to Navigation and Railways, since the last Edition of the work. The opportunity offered by the publication of this Seventh Edition, has also been seized by the Author for the purpose of improving every part of the work, and rendering it more suitable to the purposes of the public in general, and of those interested in Railway Travelling and in Steam Navigation.

Although the principal part of the work will be written in a style adapted to the general reader, the information required by those engaged in Engineering will not be overlooked: it is hoped, therefore, that the volume will be found to be an easy and useful introduction to Steam Engineering for all those who are interested in the Arts and Manufactures. It will probably contain all the practical information which is required by many of these, and will serve as a preparation for more technical, detailed, and voluminous works, for all.

Each Number will consist of Forty-eight full octavo pages, and the Illustrations will be executed in the best manner. A beautiful engraving from the statue of Watt, by Chantrey, will be prefixed to the volume.

Printed for TAYLOR & WALTON, Booksellers and Publishers to University College, Upper Gower-street.

MAPS of the SOCIETY FOR THE DIFFUSION OF USEFUL KNOWLEDGE.

No. 80 of this Series, containing a general Map of AFRICA and a Map of PANJAB, and of part of AFGHANISTAN, will be published the 23rd inst. at the Society's Office.

20, Lincoln's Inn-fields. 2nd Sept. 1839.

Just published, in fcap. 8vo. 5s. cloth,

EDUCATION for the PEOPLE. By Mrs. HIPPISLEY TUCKFIELD. Containing PASTORAL TEACHING, VILLAGE TEACHING, TEACHER'S TEXT-BOOK, and INSTRUCTION OF DEAF AND DUMB.

Printed for Taylor & Walton. 28, Upper Gower-street.

MURCHISON'S GEOLOGY.

Now ready, 2 vols. royal 4to. with large Geological Map, Views, Coloured Sections, and numerous Plates of Organic Remains,

THE GEOLOGY of the SILURIAN REGION, or BORDER COUNTIES of ENGLAND and WALES. By RODERICK IMPEY MURCHISON, Esq. F.R.S. Vice-President of the Geological Society.

John Murray, Albemarle-street;

Wrightson & Webb, and all other Booksellers, Birmingham.

TEGG'S HAND-BOOK FOR EMIGRANTS.

In 1 handsome volume, duodecimo, price 4s. bound in cloth,

TEGG'S HAND-BOOK for EMIGRANTS; containing Useful Information and Practical Directions on Domestic, Mechanical, Surgical, Medical, and other Subjects, calculated to increase the comforts, and add to the conveniences of the Colonist.

London: printed for Thomas Tegg, 73, Cheapside; and may be procured, by order, of all other Booksellers in the Kingdom.

THE BOOK OF THE THOUSAND NIGHTS AND ONE NIGHT, from the Arabic of the Egyptian MS. as edited by W. H. MACNAGHTEN, Esq. B.C.S.; done into English By HENRY TORRENS, Esq. B.C.S. B.A. And of the Inner Temple.

Volume I. 8vo. cloth, price 10s. 6d.

This Volume, printed in Calcutta, contains Fifty Nights, amongst which will be found many new Stories, and has the advantage of containing the whole of the Poetry of the original, hitherto untranslated.

Wm. H. Allen & Co. 7, Leadenhall-street.

DR. ARNOTT'S and other improved SELF-REGULATING STOVES, at the Original Manufactory of T. E. HUXLEY, 16, Castle-street, Long-acre, next to the Brewery of Messrs. Combe & Delafield.

ENVELOPES, WARRANTED THE BEST THAT CAN BE MADE, 1s. 6d. per hundred, or 15s. per 1000; Envelopes black bordered, for mourning, 5s. per hundred —An extensive and elegant assortment of Envelope Cases, filled with Envelopes, from 8s. 6d.—Printed Invitation and Kitchen-thanks Notes, with gilt edges, 1s. 3d. per quire—Name-plate elegantly engraved, and 100 of superfine cards printed, for 5s.—Writing Papers of every description at wholesale prices—Superfine Bath Post, 9s. 6d. per ream, or 6d. per quire, not Outsides—Note do. 6s. per ream, or 4d. per quire—An elegant assortment of Dressing Cases, from 8s. 6d. (fitted with razor-strop, comb, and shaving-brush,) to 50 guineas—Hair and Tooth Brushes, Toilet Bottles—Travelling Writing Cases, Dispatch Boxes, Wellington Cases, in russia and other leather, from 15s. 6d.—Blotting-books, at 1s. 6d.; ditto, with locks, 4s. 6d.—The most choice Selection of Bibles and Prayer Books in London. The whole of the above articles 20 per cent. under any house in London.—To be had at STOCKEN'S, 53, Quadrant, Regent-street, two doors from Swan & Edgar's. Observe the Name and Number.

TO THE NOBILITY AND GENTRY.

J. DELCROIX & CO., 158, New Bond-street, beg leave most respectfully to solicit the attention of the Nobility and Gentry to their extensive, long, and highly celebrated Establishment, and to inform them that the only genuine, exquisitely fragrant, and delicate PERFUMES, are those which are Manufactured by themselves, and which bear the Address of 158, NEW BOND-STREET, with the Signature of J. Delcroix. The high and *envied* celebrity of J. Delcroix's Perfumes has produced many spurious imitations, for the selling of which J. Delcroix & Co. have obtained Injunctions from the High Court of Chancery against several parties; and they beg to apprize their connexion that they will persist in their determination to proceed against all persons that may attempt any invasion of their rights.

TO ARTISTS, TOURISTS, AND ADMIRERS OF THE FINE ARTS.

PARLOUR'S PATENT PORTABLE SKETCHING-CASE, or DELINEATOR, is confidently recommended to the notice of all attached to the Science of Drawing, as being infinitely superior to the Camera Lucida, and all other instruments hitherto invented for the purpose of sketching. The Sketching-Case may be held in the hand, and a correct drawing made of any object or landscape, or it may be attached to a table in the same manner as the Camera Lucida. It is simple in management, and does not exceed in size a common sketch-book. Manufactured for the Patentee by REEVES & SONS, 150, Cheapside; and may be had also of Smith & Warner, Marylebone-street, Piccadilly; Huntly, Optician, 24, Regent-street; Cary, Optician, Strand; Watkins & Hill, Opticians, Charing-cross; Winsor & Newtons, Rathbone-place; and at all other Opticians and Artists' Repositories.

STOCKEN'S LONDON-MADE ROSEWOOD or MAHOGANY GENTLEMEN'S DRESSING-CASES, containing two razors, nail scissors, button-hook, tweezers, shaving soap and brush, strop, comb, tooth, nail, hair, and clothes brushes, with good looking-glass, for 18s. 6d., the cheapest article ever offered to the public.—Ladies' Rosewood Dressing-cases, fitted complete, from 16s. 6d.—London-made Rosewood or Mahogany Writing round-corner Desks, with ink-glass, at 10s. 6d. —Ladies' Rosewood Work-boxes, in great variety, from 4s. 6d. The above articles being warranted can be had at Stocken's Manufactory, 53, Quadrant, Regent-street, next door to Swan & Edgar's, south side of the Quadrant.

CARPET, CABINET, and UPHOLSTERY WAREHOUSE, 293, 294, and 295, HIGH HOLBORN. Families about to furnish are solicited to inspect the above Warerooms, which are replete with elegant goods of a superior description, at exceeding low prices. The following are especially deserving notice:—BRUSSELS CARPETS. The largest and most splendid collection of new patterns in the metropolis, combining durability of fabric and novelty in design, with economy in price.—CABINET FURNITURE, BRITISH and PARISIAN. This department, from its extensive stock and superior arrangement, affords facilities for expeditious selection not equalled by any house in town.—BEDDING. Particular care is given to ensure every article well seasoned, and free from taint.—UPHOLSTERY. The stock of chaste new pattern chintzes, tournays, worsted, silk, silk and worsted damasks, tabbiettes, moreens, &c. is exceedingly large and well assorted, great attention having been paid to the selection of warranted colours and exquisite designs.

LYON, HOTSON, & COMPANY, 293, 294, and 295, High Holborn.

STRONG WINDOW GLASS, for Conservatories, first-rate Buildings, &c., Crown and Sheet Window Glass Warehouse, 89, High Holborn, London.—CLAUDET & HOUGHTON beg to direct the attention of Noblemen, Gentlemen, and the Public, to their SHEET WINDOW GLASS, which, although but little higher in price than crown glass, possesses more than double its strength, and is perfectly flat and of superior colour and quality. The inferior qualities, suitable for conservatories, &c., may be used in long lengths (so desirable for appearance and beneficial to vegetation), without the liability of being broken by hail, strong winds, &c. Crown window glass of the best manufacture. Fluted glass, which answers the purpose of a blind, and admits more light than any other.

FRENCH GLASS SHADES.—REDUCTION OF PRICES, at CLAUDET & HOUGHTON'S Wholesale and Retail Warehouse, 89, HIGH HOLBORN.

The improvements and economy effected since the introduction of the manufacture of Glass Shades in England, have enabled C. & H. to offer them at a reduction of price averaging more than 15 per cent.

Museums, Model-rooms, Laboratories, Show-rooms, and Private Residences, may now, at a very reduced cost, be supplied with this article, so necessary for the preservation of ornaments and delicate objects.

The following examples will suffice to give an idea of the new prices:

	Height.	Length.	Breadth.	Price.
An Oval Shade	24 inch.	18 inch.	9 inch.	£2 6 0
do.	22	17	8½	1 15 0
do.	20	15	7½	1 1 0
do.	18	12	6½	0 10 0
do.	14	9	5	0 5 10
do.	10	6	4	0 3 7
	Height.	Diam.		
A Round	28	12		1 8 0
do.	24	11		0 14 6
do.	20	9		0 9 9
do.	18	8		0 6 6
do.	14	6		0 4 1
do.	10	5		0 2 11

EYE-PRESERVING SPECTACLES.

CHAMBERLAIN, Manufacturer of the EYE-PRESERVING SPECTACLES, upon unerring principles, respectfully informs the Public that his prices are less than half those usually charged by other Opticians.

Patronized by the Nobility, Clergy, the Principals of the British Museum, and strongly recommended by most distinguished Members of the Colleges of Physicians and Surgeons.

A pair of best Convex Pebbles, fitted to the purchaser's own frame, 5s.; Concaves, 7s. 6d.; Convex Glasses, 1s.; Concaves, 2s.

Best Brazilian Pebbles, in gold frame	£1	15	0 for Ladies.
Ditto ditto double joints	2	5	0 Gentlemen.
Ditto ditto standard silver	0	15	0 Ladies.
Ditto ditto double joints	0	16	0 Gentlemen.
Ditto ditto finest blue steel frame	0	15	0 Ladies.
Ditto ditto double joints	0	16	6 Gentlemen.
Ditto ditto tortoiseshell frame	0	10	0 Ladies.
Ditto ditto best black buffalo horn	0	7	6 Ladies.
Ditto ditto strong steel frame	0	6	6 Mechanics.

The above are all glazed with the clearest Brazilian pebbles, composed of pure crystal, which is acknowledged by Oculists to be the most pellucid and perfect substance that can be used for Spectacles.—Best Glasses, in steel frames, from 1s. 6d. to 2s. 6d.—Ditto ditto, best horn ditto, 2s. 6d.

Letters are requested to be post-paid. Orders attended to within ten miles of London; a month's trial allowed, within which time customers may exchange their purchases without extra charge.—Country and Foreign correspondents may be suited either by sending the glass last used, or part of it, or by stating at what distance they can read common type, specifying the length of time they have used spectacles.

37, Broad-street, Bloomsbury, in a direct line with Holborn.

MENTAL HAPPINESS and POWERS of REASON RESTORED by a SIMPLE PROCESS.—Medical science has been long charged with impotence in two or three of the greatest afflictions of the human race. Of these the greatest is Insanity, to remove which, professional men of all countries have directed a large portion of their time, but their efforts have been abortive. Sensible of the doubt, therefore, that exists as to the possibility of curing Insanity or Nervous Complaints, Dr. WILLIS MOSELEY has not agitated the public mind by details, as he might have done, of 2,500 cures in five years, but has invited private inquiry. And such has been the confidence created, that three Physicians, six Surgeons, and a London Hospital Professor have placed themselves, their brothers, sisters, or patients, under his treatment, and each has been cured. This being the first and only discovery ever made for the cure of nervous complaints and insanity, the afflicted ought not to be denied its benefits. Apply to, or address, post paid, Dr. Willis Moseley & Co. 9, Charlotte-street, Bloomsbury, from eleven to three.

GOWLAND'S LOTION.—This invaluable preparation, equally remarkable for its long-established celebrity and elegant adaptation for many useful purposes, offers at this season pleasing indemnity against the recurrence of CUTANEOUS IMPURITIES, and every species of IRRITABILITY and DISCOLORATION incident to an increasing temperature. As a TOILET requisite, the Lotion refreshes the Skin, preserves its smoothness and elasticity, and establishes an enduring opacity of the Complexion.—"ROBERT SHAW, 33, Queen-st. Cheapside," is engraved on the Stamp, and 'The Theory of Beauty' is inclosed. Prices, 2s. 9d., 5s. 6d.; quarts, 8s. 6d.

INDIGESTION, &c.—The ill effects of eating imprudently of fruit, shell-fish, and other food of an irritable nature to the bowels, are immediately removed by a wine glass dose or two of a pleasant and palatable remedy, BABINGTON'S ELIXIR OF RHUBARB, the only equally agreeable and efficacious form in which that invaluable medicine, Rhubarb, can be administered. From its specific tendency to assist rather than force the efforts of nature, it is rapidly superseding the baneful use of deleterious and violent purgatives, which too often aggravate the diseases they are expected to cure. Sold in Bottles, 4s. 6d. and 2s. 9d., by J. KING, Proprietor, 72, Queen-street, Cheapside; Barclay, Farringdon-street; and all Chemists.

A CARD.—When the most important functions of life are suspended, and those who are invalids by inheritance or imprudence are reduced to the most deplorable state of nervous debility, it is not in despair that relief is to be found. It has been ascertained beyond a doubt, that these circumstances are occasioned by a general or partial relaxation or weakness in either sex, and it is equally certain that SEDDON'S genuine AROMATIC LOZENGES of STEEL are the best, if not the only remedy ever discovered for this species of debility. When taken into the stomach they immediately diffuse themselves like a vapour through every pore, producing effects at once delightful, salutary, and permanent. When the spark of life begins to grow dim, the circulation languid, and faculties paralysed, these Lozenges are found to give tone to the nerves, exhilarate the animal spirits, invigorate the body, and re-animate the whole man. When aversion to exercise, loss of depravity of appetite, and pallid countenance, indicate approaching consumption, the delicate female will be preserved and restored to health and society by the benign influence of this medicine. Prepared only by the Proprietor; and sold by his Agents: Mr. Sifford, 104, Strand; Mr. Johnston, 68, Cornhill; and Mr. Sanger, 150, Oxford-street. In Boxes at 7s. and 22s. each. Observe, each box is signed J. P. Seddon.

THE APERITIVE FOUNTAIN prevents confinement of the Bowels (which, it is said, brings half the population of England to a premature grave) by means of a little plain water, without the disagreeable and injurious aid of opening medicines. It is far superior to any lavement machine, as it needs no fixing: admits no air; and, moreover, affords the pleasure of being, with its contents, always about or ready in the pocket or in a lady's reticule, to any appropriate place. —VOICE CONDUCTORS, designed by Dr. SCOTT upon a progressive scale of power, calculated for any case, from the slightest defect in hearing up to the most intense deafness. The highest power conductor, or SONIFERON, enables the most feeble individuals to participate in the pleasures of conversation. The lowest power, or *self-supporting* CORNET, exempts the wearer from the trouble of holding trumpets to the ear: it may even be worn under hats and bonnets. These, with the intermediate Conductors, are adapted to every shade of deafness. Persons in the country can receive suitable Conductors by addressing particulars to W. PINE, Superintendent at Dr. SCOTT'S Repository, 360, Strand (three doors from Exeter Hall), London.

OXYGENOUS AERATED WATER, SEARLE'S PATENT.—This most salutary beverage is a condensed and sparkling solution of VITAL AIR, as it exists in the Nitrous Oxide of Sir Humphry Davy, and possesses, in a moderate degree, the exhilarating properties of that Gas upon the system. It is accordingly recommended to the DEPRESSED IN SPIRITS, to the DEBILITATED, and to the EXHAUSTED by fatigue, too late hours, or intense application to business. The sufferers by ASTHMA and the DYSPEPTIC have derived singular benefit by its use, as well as the CONSUMPTIVE. It possesses also the antacid qualities of SODA WATER, and may be taken at all times by the most delicate. Manufactured by the Patentee, No. 8, Fitzroy-street; and sold at 6s. per dozen by all respectable Chemists in London; and by Poole, Brighton; Maddock, Tonbridge Wells; Twenherrow, Leamington; Tylee & Co. Bath; Ferris & Co. Bristol; Spence, York; Law, Manchester; Greville, Northampton; Butler, Edinburgh; Dean, Dover; and King, Rochester.

RESTORATIVE FOR THE HAIR.—To the Editor of the *Shipping and Mercantile Gazette*.—Sir,—Being a daily reader of your useful journal, I am anxious to make known through its columns the value of a preparation called "Oldridge's Balm of Columbia," for the purpose of restoring, strengthening, and preventing the loss of hair. It was first recommended to a member of my family—who, at the time, was rapidly losing her hair—by a lady of title, residing in Clarges-street, Piccadilly (whose name I have no authority for publishing), and by the use of this preparation, the hair has ceased, even within a day or two, to fall off in the way it had done, and that had already deprived the head of more than half "its fair proportion;" but before the package—of but a few shillings cost—was consumed, the remaining hair became perfectly firm and strong, and a "most abundant" crop made its appearance in place of what had been lost before. As the knowledge of the fact may be of the same benefit to others similarly circumstanced, I am induced thus to trouble you; and as I pledge you my word that I have no knowledge whatever of the proprietary of the production, nor object in the matter other than that of a desire to render the information available "to all whom it may concern," I trust to your usual liberality to give it publicity.—I am, Sir, yours, &c. W. H. MARSHALL.

Lloyd-square, Pentonville, London, Jan. 14, 1839.

C. A. OLDRIDGE'S BALM prevents the hair turning grey, produces a beautiful curl, frees it from scurf, and stops it from falling off, and a few Bottles generally restore it again. Price 3s. 6d., 6s., and 11s. per Bottle. No other prices are genuine. Some complaints have reached the Proprietors of a spurious Balm having been vended. They again caution the public to be on their guard against the base impostors, by especially asking for Oldridge's Balm of Columbia, 1, Wellington-street, Strand.

8, NEW BURLINGTON STREET, SEPT. 6, 1839.

MR. BENTLEY HAS JUST PUBLISHED THE FOLLOWING
New Works:

I.

IRELAND:
SOCIAL, POLITICAL, AND RELIGIOUS.

By GUSTAVE DE BEAUMONT.
Edited by W. C. TAYLOR, L.L.D. of Trinity College, Dublin.
2 vols. post 8vo.

II.

MR. HOOK'S 'JACK BRAG' COMPLETE FOR SIX SHILLINGS;

FORMING THE
NEW VOLUME of the STANDARD NOVELS and ROMANCES;
Which also contains, uniform with 'Jack Brag,'
MR. HOOK'S 'MAXWELL,' complete in 1 vol. price 6*s.*; and 'THE PARSON'S DAUGHTER,' complete in 1 vol. price 6*s.*

III.

VICTORIES OF THE BRITISH ARMY.

By the Author of 'Stories of 'Waterloo,' 'Wild Sports of the West,' &c.
In 2 vols. 8vo. with Characteristic Illustrations and Portraits.

IV.

CONFESSIONS OF A THUG.

By CAPT. MEADOWS TAYLOR, of the Service of His Highness the Nizam.
3 vols. post 8vo.

"If this work fails to arouse the feelings of the public to the suppression of Thuggee, no other can; as no other can be better calculated to excite the lively interest of the reading community. To the admirers of romances it will afford a treat, such as they have not had for years; for not one of those publications contains so many fearful scenes, while the truth and reality of these will lend them an interest such as no mere fiction can excite."—*Atlas.*

V.

NEW ZEALAND:
A RESIDENCE IN THAT COUNTRY FROM THE YEAR 1831 TO 1837.

By J. S. POLACK, Esq.
A new and cheaper Edition, in 2 vols. 8vo. with Plates, price 16*s.*

VI.

HON. C. A. MURRAY'S TRAVELS IN NORTH AMERICA;
INCLUDING
HIS RESIDENCE WITH THE PAWNEE INDIANS.
Dedicated by Special Permission to the Queen. 2 vols. 8vo. with Plates.

New Works preparing for immediate Publication:

I.

THE CONCLUDING VOLUMES OF THE
MEMOIRS OF CHARLES MATHEWS, COMEDIAN.

By MRS. MATHEWS.
(VOLS. III. and IV.) With numerous Characteristic Illustrations and Portraits.

II.

THE DUKE AND THE COUSIN: A NOVEL.

By MRS. GREY. 3 vols.

III.

MEMOIRS OF HIS OWN TIME:
INCLUDING
THE REVOLUTION, THE EMPIRE, AND THE RESTORATION.
By LIEUT.-GEN. COUNT MATHIEU DUMAS, Private Secretary to Napoleon.
2 vols. 8vo.

THE NEW NOVELS, TO BE HAD AT ALL THE LIBRARIES.

1. HAMILTON KING. By THE OLD SAILOR, Author of 'Tough Yarns,' 'Land and Sea Tales,' &c. 3 vols.
2. STORIES of TORRES VEDRAS: a Companion to the 'Stories of Waterloo.' By J. G. MILLINGEN, M.D., Surgeon to the Forces, &c. 3 vols.
3. CHARLES TYRRELL. By G. P. R. JAMES, Esq. Post 8vo. with Portrait of the Author, engraved by Greatbach, price 21*s.*
4. THE CABINET MINISTER. By MRS. GORE. 3 vols.
5. BIRTHS, DEATHS, and MARRIAGES. By THEODORE HOOK, Esq. 3 vols.
6. THE WIDOW BARNABY. By MRS. TROLLOPE. 3 vols. 24*s.*
7. OLIVER TWIST. By CHARLES DICKENS, Esq. Second Edition. 3 vols. with 24 Illustrations by George Cruikshank, price 25*s.*
8. SAYINGS and DOINGS of SAM SLICK, THE CLOCKMAKER. FIRST and SECOND SERIES. In 2 vols. post 8vo. with Plates, price 21*s.* Either Series may be had separately, in 1 vol. price 10*s.* 6*d.*

RICHARD BENTLEY, New Burlington Street, Publisher in Ordinary to Her Majesty.

London: JAMES HOLMES, 4, Took's Court, Chancery Lane. Published every Saturday, at the ATHENÆUM OFFICE, 14, Wellington-street North, Strand, by JOHN FRANCIS; and sold by all Booksellers and Newsvenders.—Agents: for SCOTLAND, Messrs. Bell & Bradfute, Edinburgh; and D. Campbell, Glasgow;—for IRELAND, J. Cumming, Dublin.